Telephony.

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RELATIONS WITH EMPLOYES.

Publicity, like charity, should begin at home. Take the employe into your confidence; explain to him the whys and wherefores. Trust him, and he will not distrust you and will become an invaluable aid.—John A. Beeler.

"Telephony's" Home Study Course.

Efficiency is the biggest word in the telephone man's dictionary. Time was when a little knowledge was not a dangerous thing, but the development of the art and practice of telephony has created opportunities and positions for the men who know the business, both from a commercial and technical standpoint. Now the incompetents and the men who have a little knowledge but are indifferent about acquiring more through study, are being crowded out by workers who are more efficient.

Telephone conventions now, both national and state, have taken on a different aspect from those of the past. The programs are of an entirely dissimilar nature. Where a few years ago politics was the feature, questions of operation and management now have the place of honor on the program. The attendance at all conventions has been unusually large, and keen interest has been evinced in all sessions. There seems to be an overwhelming desire by telephone men to gain all information possible concerning every angle of the business.

It was for this reason that TELEPHONY, in January, inaugurated a "Home Study Course" presenting, in a clear and logical manner, the fundamental principles that underlie the art of telephony. Beginning, with the elements of telephony, the novice in the telephone business has no difficulty in following it through the various branches of the art. The course not only includes descriptions and explanations of switchboards, equipment and instruments, and construction, but also discussions of testing, maintenance, the handling of traffic, exchange plans, specifications, material, manufacturing methods and other matters in which the operating man is interested and desirous of gaining a further knowledge.

Naturally the result of employes conscientiously following such a course, will be of material benefit to telephone companies. Knowing the principles involved in their work, their efficiency and value will be greatly increased. The use of "cut and try" methods will be lessened with corresponding decreases in the construction and maintenance accounts.

In March we added another course of home study, designed to present logically the principles which govern successful organization and operation of telephone properties.

The success of these two courses is a matter of gratification and shows that the men engaged in telephone work are anxious to improve their minds. One large operating company sent subscriptions for each employe, excluding operators. Another company sent subscriptions for its advertising agent, advertising manager, all officers, all district managers, chief clerk of traffic, chief and assistant engineers, commercial engineer, district traffic chiefs, superintendents of plant, equipment and construction foremen, etc., aggregating 36 in all.

Another large company sent in 150 subscriptions with a lengthy letter complimenting TELEPHONY on the great good these courses would do. Letters and subscriptions came from every state and the interest aroused was such that of the first eight installments, we made 13,000 reprints. These are now exhausted but letters continue to come by every mail asking for the early installments. Each installment, however, is complete in itself so that a reader may commence any time and get the advantage of the remainder of the course which we estimate will run two years and possibly more.

Before beginning these courses, TELEPHONY was reaching practically every telephone company of over 200 subscribers and many of the smaller ones. To reach a greater stage of usefulness to the field, it seemed necessary to get to the employes, the men who do the real work in the field, and, in getting to them, to give them the opportunities of becoming the managers and owners of tomorrow.

The plan was to make for efficiency, to help men to help themselves, and it is working out splendidly. We wish to thank the telephone men who have so materially helped to make TELEPHONY still more valuable to the field it represents.

Old Sleuth, the Balance Sheet

By HERBERT KAUFMAN

You're going to lose your job. The boss isn't on to you yet, but Old Sleuth, the balance sheet, has taken up your trail and it's only a matter of time before his eagle eye will locate the thief who is stealing the firm's opportunities.

You're playing a crooked game, robbing your employer of his chances to procure the best ideas and secure the best men in the market. Your craze for credit is interfering with his pursuit of cash. You're obsessed with the same futile notion that has ruined thousands before you. You think it's possible to block a meritorious proposition from an outside source. What you can't do, you won't have done.

You've passed a little tariff law of your own. While you are in charge of the port of entry, all suggestions of foreign origin will be debarred for landing. Like many another infant industry, you aspire to too much protection. But there's one form of duty which you overlook—the duty which every employe owes to his paymaster.

To insure your own security, you jealously discourage the expression of enterprise and originality in your assistants. You detect a rival in every competent subordinate and select only commonplace and inferior helpers, under the delusion that by measurement with your underlings, you will stand out like a giant. But digging away the earth around a pole doesn't lift it an inch higher. It merely brings the dirty section out of hiding.

We measure merit by its rise. By the same token, men merit measurement by the means through which they seek to rise. The true worth of executives is not obtained by contrast with second rate clerks—we estimate them by the efficiency of similar officers in rival businesses.

Last week you aborted the presentation of a plan which would have effected enormous economies. Yesterday you withheld a practical scheme from the notice of the folks higher up. Rumor is lately hinting that it's a waste of time to bring a first class idea to your firm—that you exercise your right of decision solely in your own behalf and deny the right of way to your betters.

But you can't get away with it! Disclosure is inevitable. You may manage to repel invasion of the private office, but when the end of the year arrives and the management reviews the annual statement, dollars and cents will tell and tattle, too.

There's no room in either baseball or business for solitaire players. The grandstander, who considers his individual average without regard to the fate of the nine, doesn't last in any organization. If you had horse instead of ass sense, you'd analyze the careers of a few successful operators and find that you're not working for yourself when you're not working for the house.

A good picker of men and methods always stands a splendid chance for partnership. That's about all there is to management.

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Practical Telephone Suggestions for Exchange Men

The Second of a Series of Short Articles Dealing with Important Phases of Telephone Work—Furnishing Current to Private Branch Exchanges—The Charging Current—Current for Ringing Purposes—The Floating Battery Method and Care of Battery

By Ray H. Manson

The installation of small switching equipment, commonly known as private branch exchanges, offers many opportunities for ingenuity in making a serviceable job and one requiring the minimum of attention.

The first consideration of all P. B. X. switchboard installa-

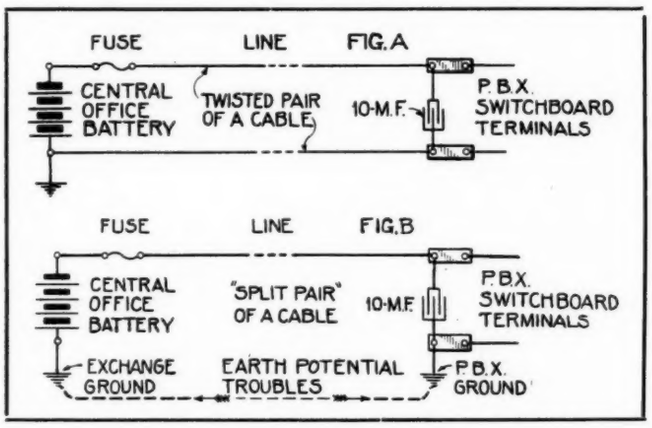


Fig. 1. Correct and Incorrect Feeding Battery P. B. X. Boards.

tions, regardless of size, must be the getting of maximum transmission of speech at all times, especially when the circuits are extended to the main exchange.

CURRENT SUPPLY FOR PRIVATE BRANCH EXCHANGES.

The branch exchange trunk lines usually are arranged so as to furnish current direct to the P. B. X. telephones for talking and signaling, when connected through for this service. Two advantages are obtained by this method. They are:

(a). The transmission from a P. B. X. telephone is on a par with a straight line instrument. It can be "boosted" by the higher voltage toll board battery for long distance purposes, if such a booster battery is employed.

(b). The interconnecting of local P. B. X. subscribers then can be had without requiring a full voltage battery as the lines are usually short and the current demands low. In fact, the small key type of P. B. X. systems, of not over 10 lines

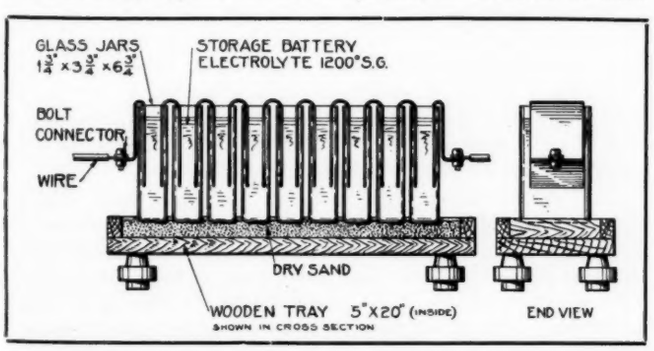


Fig. 2. 10 mf. Condenser Made From Several Smaller Condensers.

capacity, can be operated on a primary battery of dry cells connected in series-multiple.

The larger P. B. X. installations of over 20 lines and those using more than one operator, must be treated similar to a small isolated common battery switchboard and a suitable storage battery plant with charging means provided.

Two entirely different methods of furnishing charging current from the central office are given in this article.

CONDENSER METHOD.

Battery current for operating a private branch exchange of small size can be furnished advantageously from the central office through spare cable pairs when the latter are available for this purpose. This does away with a separate battery at the branch exchange, making the installation very simple and the maintenance almost nothing.

The available cable pairs are connected so as to form a metallic circuit from the main exchange battery to the terminals of the P. B. X. switchboard, as shown in Fig. 1-*A*. A ground return circuit, such as shown in Fig. 1-*B* should not be used, as the branch exchange talking circuits are liable to become noisy through induction or through the presence of foreign earth currents, which might exist between the main exchange and branch exchange locations.

The 10 microfarad condenser, shown connected across the terminals of the P. B. X. switchboard in Fig. 1-*A* is to prevent cross talk which would otherwise exist, due to ohmic resistance of the cable conductors, when two or more conversations are carried on simultaneously. This 10 mf. condenser can be made up of five ordinary 2 mf. telephone condensers, with the terminals connected in multiple, as shown in Fig. 2. The connecting wires from these condensers to the switchboard terminals should be as short as possible, and of large size,

DISTANCE OF P.B.X. FROM CENTRAL OFFICE LENGTH OF LINE:	NUMBER OF CORD CIRCUITS USED SIMULTANEOUSLY											
	1	2	4	6	8	10	1	2	4	6	8	10
	CABLE PAIRS REQ'D WHEN No.19 B&S.						CABLE PAIRS REQ'D WHEN No.22 B&S.					
500 Ft.	1	1	1	1	1	1	1	1	1	1	1	2
1000 "	1	1	1	1	1	2	1	1	1	2	2	3
2000 "	1	1	2	2	2	3	1	1	2	3	4	5
3000 "	1	1	2	3	3	4	1	2	3	5	6	7
4000 "	1	1	2	3	4	5	1	2	4	6	8	9
5000 "	1	2	2	4	4	6	2	3	5	7	9	11
10000 "	2	3	5	7	9	11	3	5	9	14	17	22

Cable Pairs Required for Supplying Battery to P. B. X. Boards.

say about No. 12 B. & S. gage copper. If small wires are used for this purpose, the ohmic resistance might be sufficient to cause cross talk.

While one cable pair will be of sufficient carrying capacity to supply exchange battery current for several branch exchange cord circuits, when used simultaneously (provided the distance is not too great to the central office), the use of a large number of P. B. X. cord circuits and the increase of the cable length, will result in insufficient current for talking and signaling. The remedy for this is the using of several cable pairs in multiple, or the limiting of the size of the branch exchange installation to the available cable pair capacity.

One authority has given the figures listed in the accompanying table of cable pairs, as safe for a simple type of branch switchboard in which the talking current is fed to the branch exchange lines through 200-ohm coils (100 ohms on each side of the battery bus bars), and the main exchange supply is 24 volts. Two sizes of cable conductors are given, No. 19 and No. 22 B. & S. gage copper. The data for other sizes can be estimated when it is remembered that the cross section (carrying capacity) of B. & S. gage wires is approximately doubled every three sizes.

The providing of main exchange ringing current for private branch exchange purposes can be accomplished by the use of

one cable pair, as shown in Fig. 3-*A*. In order to prevent induction noises, the circuit from the source of ringing current at the main exchange to the private branch exchange switchboard terminals, should be metallic and a twisted pair. A single wire, or split pair, such as shown in Fig. 3-*B*, will result in ringing noises in talking circuits which are in the same cable.

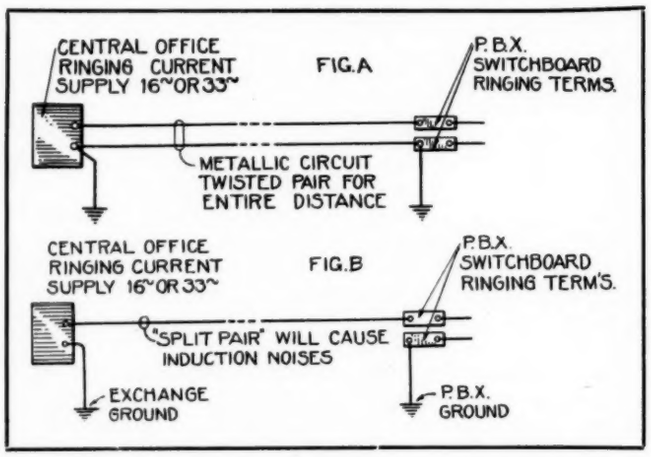


Fig. 3. P. B. X. Ringing Current Supply—Incorrect Feeding.

When harmonic ringing current is available, either the 16-cycle or the 33-cycle current can be used, the latter giving excellent results.

It is not necessary to provide a separate cable pair to serve each branch exchange with ringing current. One cable pair can serve a number of P. B. X. switchboards satisfactorily, by bridging across the line, the same as for harmonic party line telephones. The taps from the main cable ringing pair to the private branch exchange must be metallic, twisted pair, clear to the switchboard terminals, as previously explained.

Floating Battery Method.

The following method of furnishing talking current for P. B. X. operation is being used satisfactorily in one large city on jobs which do not exceed 20 stations installed and where all telephones which are connected through the trunk lines to the central office receive talking current direct from the main battery. This leaves only local connections, signaling circuits and the operator's set to be served by the private branch exchange battery.

A home-made lead plate battery is provided for each P. B. X. system, the charging current being supplied from the central office, 110-volt direct current, lighting or power circuit, as shown in Fig. 4. One cable pair is required for each branch exchange installation, suitable protectors or fuses of not more than five amperes carrying capacity being interposed in the central office portion of the circuit.

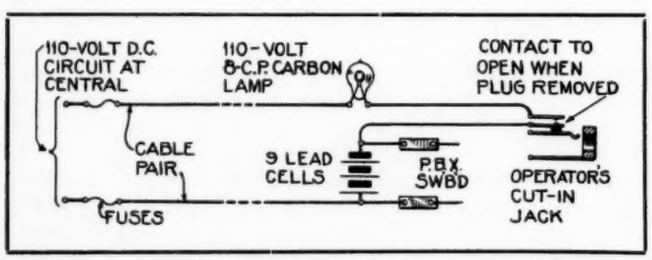


Fig. 4. Circuit for Charging a P. B. X. Battery.

The amount of charging current is regulated by an 8 c. p., 110-volt, carbon filament lamp at the branch exchange. As the type of battery used has but little capacity, it is necessary to maintain the charge at all times when the switchboard is in use. This condition is obtained automatically by providing special contacts in the operator's telephone cut-in jack, which will close when the operator plugs in her head telephone, and open when the plug is removed. By this method it is almost a certainty that the charging circuit will be open when the operator leaves the switchboard at night, and that the P. B. X. will be properly served with current in the day time.

This home-made battery is shown, completely assembled, in Fig. 5, the glass jars being 1½ ins. long by 3¾ ins. wide by 6½ ins. high (E. S. B. Co., size BT). It has been found that nine cells of this battery are sufficient for most 20-volt switchboards, although 10 cells might be required in some cases.

The battery plates are made from sheet lead about 3¼ ins. wide by 9 ins. long and about 1/16 in. thick. Both sides of these plates can be roughened with the sharp end of a coarse file or rasp, Fig. 6, to obtain a slightly greater capacity and quicker "forming" results. Each plate is doubled over in the middle to form an inverted "U."

It will be noted that the two end cells have the outside plates projecting and that the circuit wires are fastened to these free ends, by brass bolts. It is advisable to cover the bolt and bare end of the wire with "vaseline" or other grease to keep the battery solution from corroding the metal. When the battery is located near the switchboard, No. 10 B. & S. gage copper wire will be suitable for this connection. The wire selected, if not large enough (has too high resistance), will cause cross talk in the P. B. X. telephone circuits.

The battery solution can be commercial "electrolyte" of 1,200° specific gravity, such as is used for the central office switchboard battery. This "electrolyte" can be made from commercial sulphuric acid by diluting with distilled water, about one part of concentrated sulphuric acid to three parts of distilled water.

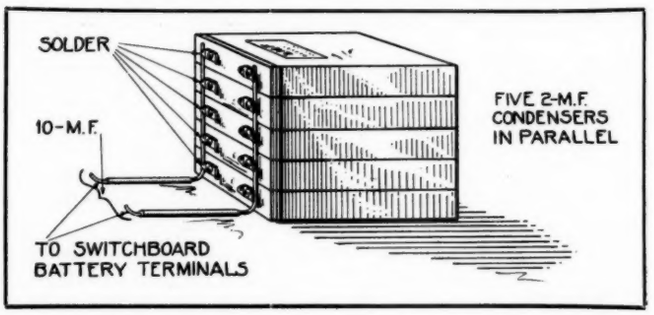


Fig. 5. Home-Made Lead Plate Storage Battery for P. B. X.

Always pour the acid into the water, slowly, at the same time stirring with a glass rod or clean wooden stick. Never pour the water into the acid. Considerable heat is generated when mixing acid in water, so it is advisable to use a porcelain bowl or a glazed stone crock for a container. Never use metal containers for holding battery solutions, or even to handle the liquid when filling the battery jars.

Just prior to the installation of this home-made battery, the plates should be "formed" by charging continuously in one direction for about 24 hours from a 110-volt direct current lighting or power circuit and then charging in the other direction by reversing the leads to the battery, for an equal length of time. The strength of current used in this "forming" charge can be regulated by means of a bank of 16 c. p., 110-volt, carbon filament lamps, as shown in Fig. 7.

Regulate the strength of the charging current so as never to be sufficiently great to cause heating of the "electrolyte."

When in service, this battery requires the same general treatment as the regular storage battery, such as the adding of distilled water to replace for evaporation, and the keeping of foreign matter out of the cells. It must be understood

that metallic particles, such as iron, in the solution will ruin any lead battery. Therefore, it should be encased in a suitable dustproof covering or cabinet.

Naturally, this type of battery has but little reserve capacity, due to the simple plate construction. It will therefore take

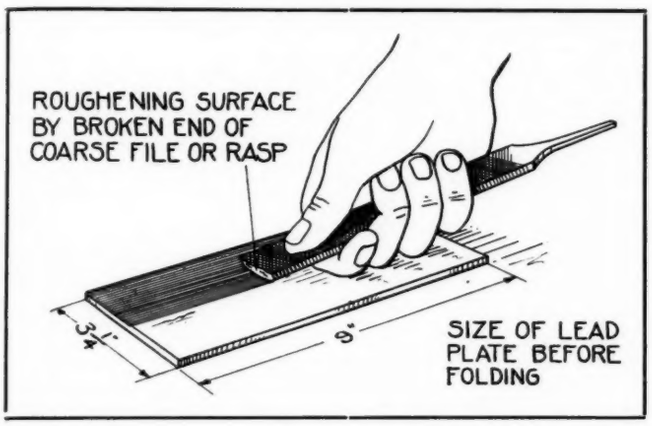


Fig. 6. Preparing Lead Plates for Home-Made Storage Battery.

several minutes each morning for the charging current to bring up the battery to the desired voltage. In practice, this has not been found to be a disadvantage, as the operator inserts the plug of her head telephone as soon as she comes on duty in the morning, thereby allowing the voltage an opportunity to come up to the desired pressure by the time the operator is ready for work.

The primary advantages claimed for this method of furnishing private branch exchange current is low cost of battery and freedom from expert attention.

This same scheme of feeding battery current from the central office can be used in connection with a small capacity, commercial storage battery, in place of the home-made battery. It is standard private branch exchange practice with a large number of operating companies. The actual wiring of the charging circuits can be varied to suit local conditions.

Kansas Telephone Statistics for 1914.

Interesting details of the talking facilities of rural and urban communities of Kansas are brought out in the telephone statistics which have recently been prepared by John M. Kinkel, of the public utilities commission. It is shown that there is one telephone for every family in the state—or a total of 332,888. This represents a gain of 91,565 over the number reported for the year previous.

The figures taken from the reports of the companies to the commission show that in 1914 the per capita Kansan spent $3.93 for telephone service, compared to $2.68 in 1913.

On January 1 there were 332,888 telephones in the state, as compared with 241,323 for the preceding year. In

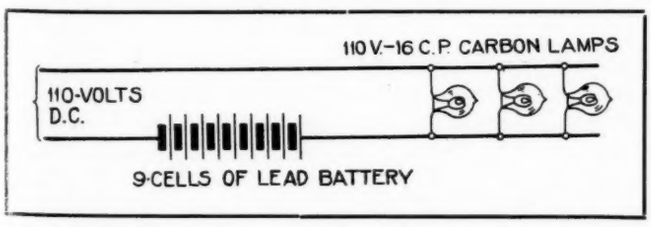


Fig. 7. Charging Circuit for Forming Plates, Home-Made Battery.

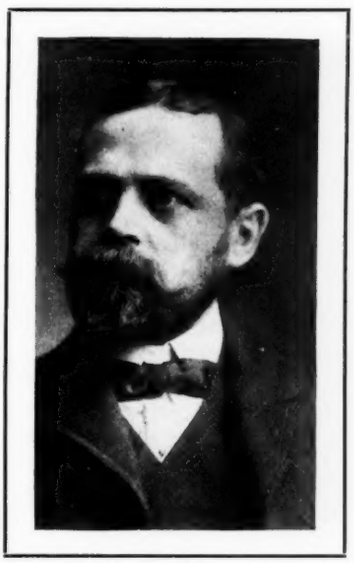
other words, if these telephones were evenly distributed among the people of the state, there would be one telephone for every five persons, or one for every family. The 1913 reports of the telephone companies to the utilities commission showed one telephone for every seven persons.

In all 569 telephone companies reported to the commission for 1914, as compared with 563 in 1913. The telephone properties in the state last year were reported to be worth $51,577,977 as compared with a total valuation of $42,671,636 in 1913, an increase of more than 20 per cent. in 12 months. The 569 telephone companies reported that they were operating 831 exchanges in the state.

The revenues of the telephone kept up with the increase in the number of telephones and the increase in property valuations. The receipts in 1914, as shown by the reports of the companies, were $6,571,784, an increase of more than $2,000,000 over the 1913 revenues, which totaled $4,547,784.

Washington Representative for Independent Association.

Edward E. Clement, counselor and attorney-at-law, Washington, D. C., has been retained by the Independent Telephone Association of America to represent its member companies before the Interstate Commerce Commission, as resident agent. As is well known, the Interstate Commerce Act provides that all telephone companies sending or receiving interstate messages must have a resident agent at Washington, D. C., upon whom the Interstate Commerce Commission can serve notices.



Edward E. Clement.

The Independent Telephone Association of America has made arrangements with Mr. Clement to represent all of its member companies who care to take advantage of the opportunity, without any cost to themselves. In other words, the association includes the feature of securing a Washington representative without any charge other than the annual membership dues, which amount to five dollars. It is believed that many companies will avail themselves of this privilege. The association is to be congratulated on securing the services of Mr. Clement, who is well known in the telephone field. The association is mailing notices to its member companies calling attention to this new arrangement. Designation forms are enclosed with the notices for the member companies to fill out so that Mr. Clement may be legally appointed their agent.

Operators Notify Subscribers of Break in Gas Main.

The telephone operators of the Southwestern Telegraph & Telephone Co., at Fort Worth, Texas, notified more than 12,000 of the 15,300 subscribers of the company in that city of the breaking of the natural gas mains which supply the city and warned them to close all jets and valves. Many instances were reported of the possible saving of human life because of the warning.

On the day when the break occurred the normal load of 11,800 calls at the three central offices in Fort Worth, between 5 and 6 p. m. was increased to 35,418 by subscribers inquiring about the gas shortage.

The storm which caused the break in the gas mains practically paralyzed long distance service of Fort Worth, and also caused considerable trouble to telephone companies within the city.

Florida Telephone Association Has Good Convention

Two-Day Meeting Marked by Presence of Entire Florida Railroad Commission—Chairman Burr, of Commission, Discussed Relation of Commission to Public and to Telephone Companies—Resolutions Adopted Favor Greater Supervision by Commission

The ninth annual meeting of the Florida Telephone Association was called to order by the president in the Elk's Hall, at Tallahassee, last Thursday afternoon, April 22. The welcome address was delivered by Hon. G. P. McCord, representing the mayor. Words of welcome were also given by Dr. W. L. Moor, vice-president of the association and president and general manager of the Tallahassee Telephone Co. The welcoming addresses were responded to by Ed. Scott, chairman of the committee and by President W. G. Brorein. The meeting was the most representative that the Florida association has ever had, as all parts of the state were represented.

Florida Railroad Commissioners Present.

In addition to the opening exercises, various committees were appointed at the afternoon session. The association convened again at eight o'clock in the evening. This meeting was addressed by George D. Ames, telephone engineer for the Florida Railroad Commission. Mr. Ames outlined the plans that have been adopted by the commission pertaining to the engineering side of the telephone business. He stated that in carrying out the rules, he expects to visit all exchanges and make a study of the central office equipment and general construction of the plants as well as a study of the operating methods and the character of service rendered. He asked for the co-operation of those present.

The next session of the convention was held Friday morning. At the invitation of the association, the entire Florida Railroad Commission, consisting of Hon. R. Hudson Burr, chairman; Hon. Newton A. Blitch, Hon. Royal C. Dunn, as well as Hon. Don C. McMullen, attorney, and George B. Ames, engineer, were present.

Hon. R. Hudson Burr addressed the meeting at length. He stated that the purpose of the commission is to serve the public by prescribing and inaugurating such rules and regulations for operating companies as will assure to the public the most efficient telephone service. He also assured the members of the association that the purpose of the commission is to secure for the operating companies fair and equitable treatment and also reasonable compensation so that they will be in a position to render proper service. He directed attention to the importance of prompt compliance with the instructions and requests of the commission. A number of companies and individuals have not complied with the request of the commission for information, and the seriousness of ignoring such requests was emphasized.

Mr. Burr stated that the commission expects to prescribe a uniform system of accounting and reports for telephone companies. He requested the co-operation of those engaged in the telephone business in working out the plans of the commission, which he believes will result to the mutual interest of the public, as well as those engaged in serving the public. His discussion of the relation of the commission to the public and to the telephone companies, was clear and forcible. Mr. Burr's address was well received by the members of the association.

Old Officers Re-Elected.

The election of officers for the ensuing year was first business of the Friday afternoon session. The officers, serving for the past year, consisting of W. G. Brorein, president, Tampa; Dr. W. L. Moor, vice-president, Tallahassee; and E. E. Voyle, secretary, Gainesville, were re-elected.

A legislative committee consisting of President Brorein, Ed. Scott of Arcadia, Dr. W. L. Moor of Tallahassee, R. W. Stowers, DeFuniak Springs, and E. E. Voyle of Gainesville, was appointed.

The executive committee was announced as consisting of G. C. Frissell, Miami; M. E. Gruber, West Palm Beach; Chas. S. Powell, DeLand, and C. A. Prims, Bonifay.

The committee on resolutions reported a resolution recommending that a law be enacted giving the Florida Railroad Commission supervision over the sale or merger of telephone properties; also that the commission shall pass upon the provisions and conditions of franchises granted for telephone purposes.

The committee also reported a resolution recommending to the Florida Railroad Commission as a reasonable rule to be prescribed by it, that bills for telephone service shall be payable at the office of the company not later than the fifteenth of each month; and if not paid at that time, that 10 per cent. may be added to cover the losses and cost of collection due to such delay. Both resolutions were adopted.

It was decided to hold the next meeting at Miami.

At six o'clock in the evening, all the members including their wives, were the guests at the home of Dr. and Mrs. W. L. Moor for the annual dinner that has been given heretofore by the association. A most agreeable evening was spent.

The association presented Mrs. Moor with a beautiful cut glass vase in appreciation of her generous hospitality. After the dinner, the members of the association in a body attended the Shakespearian Pageant given by the students of the Florida Female College on the beautiful campus of the college.

Those in Attendance.

The meeting this year was the most profitable that the association has held in its history. Those who were present at the convention were:

President W. G. Brorein, Tampa; Mrs. W. G. Brorein; Dr. W. L. Moor, vice-president, Tallahassee; Mrs. W. L. Moor; E. E. Voyle, secretary and treasurer, Gainesville.

Chas. S. Powell, Deland; R. H. Pratt, Atlanta, Ga.; W. H. Wood, Tallahassee; C. A. Prims, Bonifay; W. A. Hendry, Perry; E. S. Moorer, Atlanta, Ga.; C. E. Sudmal, Milton; F. V. Vary, Jacksonville.

C. V. Penson, Quincy; F. A. Rader, Chicago, Ill.; Ed. Scott, Arcadia; Geo. B. Ames, Tallahassee; W. U. Lathrop, Bradentown; R. L. Boyd, Jacksonville; H. R. Frazee, St. Petersburg; W. H. Adkins, Atlanta, Ga.

R. W. Stowers, DeFuniak Springs; M. E. Gruber and Mrs. M. E. Gruber, West Palm Beach; C. W. Gruber and Mrs. C. W. Gruber, West Palm Beach; D. E. Smith, Havana; J. N. Willis, Williston; W. E. Flowers, Atlanta, Ga., and Levi P. Hester, Williston.

Key West and Jacksonville to Have Automatic Connection.

Tentative plans and surveys have been completed for a long distance automatic service between Jacksonville and Key West, Fla., according to a statement made by Edmund Land, chief engineer for the Automatic Telephone Co., of Key West, now under construction.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

The answer to these questions will be found in the reading section bearing the same number. Answers are not to be sent to TELEPHONY for criticism. For the benefit of those desiring the advantages of a correspondence course, the Engineering Extension Department of the Iowa State College has volunteered to answer questions and criticize replies to questions and solutions of the problems which will be presented from time to time in connection with the course. No charge will be made for this service and the offer applies to all subscribers of TELEPHONY regardless of whether they live in Iowa or elsewhere. Correspondence should be addressed to the Engineering Extension Department, Iowa State College, Ames, Iowa.

98. How are sound waves transformed into waves of alternating current by the transmitter?

99. In what respect is the diaphragm of the standard receiver in the same condition as the diaphragms of acoustic telephones?

100. Why is a basic magnetic field necessary in all receivers? By what two means is it secured?

101. How can alternating voice currents alternately draw the receiver diaphragm nearer to the magnet poles and then permit it to recede from them?

102. What must be carefully borne in mind when connecting together the coils of any electromagnet? What is the enclosed type of electromagnet?

Practical Talks Just Among Ourselves.

The home of Mrs. Jones was one of the social centers of Fosterburg. It was surrounded by wide verandas and shaded by a beautiful row of maples. All the prominent visitors to the city were entertained there. When the Independent telephone company built its plant, this home was one of the first residences to be provided with a telephone. Having a proper idea of the value of the service, Mrs. Jones used the telephone for business as well as for many social calls.

There was one rather unusual requirement as to the adjustment of the telephone bell. She insisted that it be so adjusted as to render it unlikely that the ringing would disturb any of her guests. The installer had accomplished this by placing the gongs of the ringer very close together. This was satisfactory for a long time. Quite recently, however, many complaints had been received to the effect that many calls for this number were being lost and that, at certain hours of the day, it was impossible to get a response.

Each troubleman sent out on the case had reported "O.K. on test," assuming that the bells rung and that owing to the special adjustment, the sound was not loud enough to be heard from all parts of the house. But the complaint reports continued to come in. In addition, Mrs. Jones wrote a nice, crisp letter to the manager asking to have the trouble carefully investigated.

There was one troubleman on the force who had been taking some pains to inform himself on the theory underlying the operation of telephone apparatus. As a result the cases of trouble assigned to him seldom came in again. For this reason, it had almost become a rule to give all the "chronics" to him, so he was given this. He called at the Jones' home early in the morning and tested the bells, finding that they rang at that time fairly well and about as loudly as desired. While the adjustment seemed to be satisfactory, he took the ringer out to examine it. He found that the armature was a little too far from the pole pieces of the two coils to place it in the thickest part of the magnetic field due to the permanent magnet. Upon inquiry, he found that about nine o'clock in the morning and three o'clock in the afternoon the greatest number of "lost calls" was reported. This seemed important to him as the wire chief had said it was at these hours that the exchange handled the heaviest traffic.

Although this troubleman had succeeded in getting an "O.K. on test," he *knew* that the subscriber would not report the condition repeatedly if there were not something wrong, so he studied over the matter on his way back to the office. It was clear that when there was a heavy load on the exchange there would also be a heavy load on the exchange's ringing machine. It seemed probable to him, therefore, that the voltage of the ringing current was not quite so high then on each call as it was when the load was lighter. But other bells operated satisfactorily during these hours of heavy traffic. The coils of the troublesome ringer were not burned, as that would have become apparent instantly by the odor when the bell box door was opened. The adjustment of the armature was now all right as he had gone over it that morning.

Applying the theory of action of the ringer to this case, it became clear to him that if the magnetic flux due to the *permanent* magnet of the ringer were seriously reduced, there would be practically no effect on the armature when slightly weakened ringing current was sent through the coils. When he reached the office, this troubleman asked the wire chief if ringer permanent magnets *ever* lost a part of their magnetism. He learned that they sometimes did, but not often.

On the strength of his reasoning, and this information from the wire chief, the troubleman asked for an order for an entire new ringer. The next morning he installed the new ringer in the telephone at Mrs. Jones' house and tested it out carefully. To his delight, he found that he could now adjust the ringer

without the least difficulty so that the sound of the bell suited the exacting subscriber perfectly. Being of an investigating turn of mind, he tested the strength of the magnets on the old and the new ringers using his small steel tools as weights. He found that the magnet on the old ringer was very much weaker than the new one. The flux due to the old magnet was so weak that, when the ringing current was a trifle weaker than normal, it only reversed the flux running through the armature from one pole of the ringer electromagnet to the other. The amount of magnetic flux swung from the pole of the permanent magnet alternately to the two poles of the electromagnet was weak and had practically no effect on the armature.

The trouble was not due to the ringing machine but was due to the ringer. Any ringing machine will deliver a lower voltage when heavily loaded but the difference in the magnetic flux produced thereby in the ringer will not interfere in the least with the operation of any ringer properly adjusted and with a strong permanent magnet.

CHAPTER VI. The Magneto Set (Cont'd.).

103. *The ringer.* The device almost universally used in one form or another in exchange operating practice for calling and signaling, is the polarized ringer. While there are several different forms of this piece of apparatus, the theory of all is shown in Fig. 37-*A*. The usual arrangement, which is most familiar to telephone men, is shown in Fig. 37-*B*. The same reference letters are used in both sketches to designate the various parts. *A* is a permanent magnet to one pole of which (in the sketch it is the south pole) is attached a soft iron yoke *B*. This yoke supports two soft iron extensions, *C* and *D*, which form the cores of an electromagnet having the coils *E* and *J*. When there is no current flowing in the coils, *E* and *J*, the magnetic lines of force due to the permanent magnet *A* are divided. They pass through the air gap and the armature *I* in two branches to the upper ends of the soft iron extensions *C* and *D*. Owing to their connection through the yoke *B* with the permanent magnet *A*, the upper ends of *C* and *D* are normally south magnetic poles. The magnetic spectrum of this condition is shown in Fig. 37-*P*. The armature *I* is free to move some distance around the pivot *F* as a center.

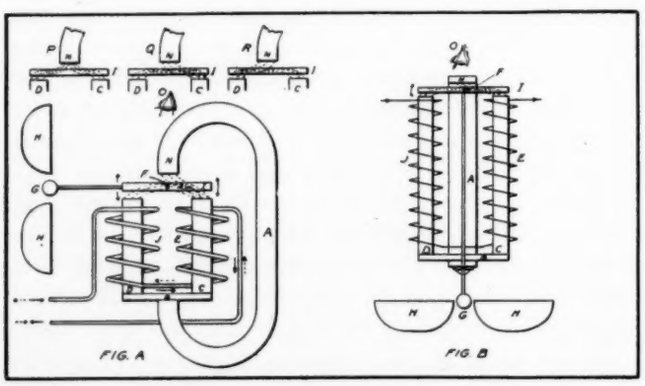


Fig. 37. The Polarized Ringer and Its Operation.

Attached to the armature is the clapper rod and clapper *G*. The clapper *G* is adjusted to strike the gongs *H*, whenever the armature *I* is thrown into vibration around the pivot *F*. The ringer as shown will be operated by alternating current in its coils *E* and *J*.

104. *Operation of the polarized ringer.* Let us consider the effect when an alternating current is sent into the winding of the coils *J* and *E*, Fig. 37-*A*. Suppose that the first flow of current is in the direction shown by the heavy arrows. An observer at the point *O* will find a flow of current around the soft iron extension *D* in a direction opposite to the movement of the hands of a clock. Therefore the normal polarity (south) of this core will be destroyed and it will become, for the moment, a north pole. The same observer will have a current flow clockwise around the soft iron extension *C*. This will strengthen the normal polarity (south) of this extension. The magnetic flux will now pass from the north pole of the permanent magnet *A* to the upper end of extension *C* as before. In addition, there will be an additional flux from the upper end of extension *D* to the upper end of extension *C*, owing to the action of the current in the coils *E* and *J*. There will be a great reduction in the flux between the north pole of the permanent magnet, *A*, and the upper end of *D* since *both* are now north poles. The magnetic spectrum under this condition is shown in Fig. 37-*Q*.

We have found that a mass of iron in a magnetic field, free to move, will place itself in such a position as to include as much of the flux in its own mass as possible. Therefore it might be expected that the right hand end of the armature *I*, would swing downward to include as much of the increased flux between the north pole of *A* and the upper end of extension *C* as possible. This is exactly what occurs. The action causes the clapper, *G*, to be thrown upwards and to strike the upper gong *H*. But the current in the coils *E* and *J* is an alternating current and immediately changes its direction of flow through their windings. It now should have the direction through the coils shown by the dotted arrows. By an application of the rule for determining magnetic polarity, we now find that the upper end of extension *C* will become a north pole instead of a south pole. The upper end of extension *D* is likewise now a strengthened south pole. The magnetic spectrum of this condition is shown in Fig. 37-*R*. The armature, *I*, will therefore swing its left hand extremity downward and will cause the clapper *G* to strike the lower gong *H*. As the current is reversed again, the clapper *G* will strike a blow on the other one of the gongs *H* and will continue to strike them alternately as long as alternating current is sent through the coils. The conventional design, shown in Fig. 37-*B*, has been worked out by experience principally as a means of economizing in the space required. Inasmuch as the frequency of the ordinary ringing current is about 20 cycles per second, about 40 blows per second will be struck on the gongs as long as the ringer is in operation.

105. *Theory of the biased ringer.* In order to obtain a ringer that may be selectively operated from the exchange by a distinctive character of current, the biased ringer was devised. The principle is shown in Fig. 38-*A* and the conventional arrangement of the ringer in Fig. 38-*B*. The same letters of reference are used for the various parts in both sketches of Fig. 38. The principle involved is quite similar to that of the standard alternating current polarized ringer. That part of the armature, *I*, lying in the magnetic field between the upper end of the soft iron extension *D*, and the north pole of the permanent magnet *A*, is removed. In some ringers of this type, this part

of the armature is bent back out of the field instead of being removed. In others, it is left unchanged from the standard sizes. A coiled spring, *K*, is added to exert a constant pull on the armature, *I*, and to keep its right hand extremity as far away from the upper end of the soft iron extension, *C*, as possible. The current used to operate this ringer selectively is pulsating current. It is a fact that alternating current will also operate it.

Pulsating current, as will be remembered, flows in the same direction always, but is interrupted periodically. The interruptions are always of the same duration and occur at fixed and regular intervals. Let us examine the action of this ringer when subjected to the flow of pulsating current in its coils. The direction of the interrupted current is shown by the solid arrows. We can readily prove by the rule for determining magnetic polarity that the flow of current in the direction shown, with the winding as arranged, will create a stronger magnetic south pole at the upper end of the soft iron extension,*C*, than is normally found there. It will also create a north magnetic pole at the upper extremity of the soft iron extension *D*. As would be the case with the standard form of alternating current ringer, the magnetic flux, due to the permanent magnet *A*, would be disturbed. It would be greatly increased between *C* and the north pole of *A* and it would be created anew between the upper end of *D* and the upper end of *C*. The magnetic spectrum under these conditions would be as shown in the small sketch, Fig. 38-*Q*.

With the proper adjustment of the spring *K*, the armature, *I*, would place itself in such a position as to include the greatest possible number of the lines of force. This would cause it to approach its right hand extremity to the upper end of the soft iron extension *C*. As it must rotate around the pivot *F*, this movement would cause the clapper, *G*, to strike the upper gong *H*. Inasmuch as the current in the coils is pulsating current, it would almost immediately cease to flow. The result is that the disturbance in the magnetic field is destroyed and the spring *K*, draws the armature I, away from the upper

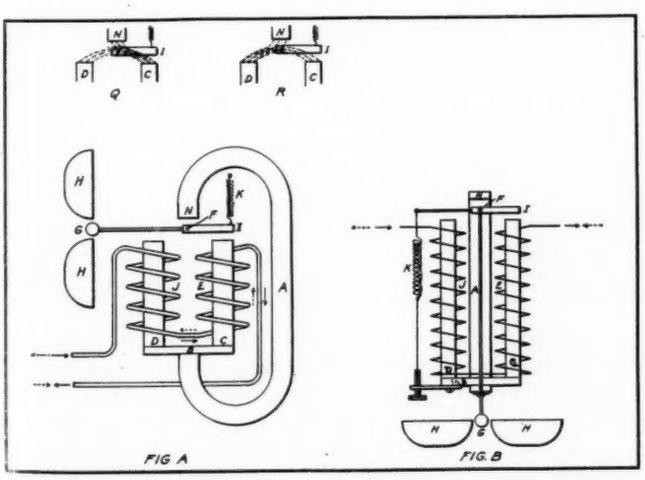


Fig. 38. The Theory of the Biased Ringer.

end of the soft iron extension *C*, causing the clapper, G, to strike the lower gong *H*. When the current starts to flow again, the first effect is repeated and the upper gong, *H*, is struck another blow. This will continue as long as pulsating current in the proper direction, is circulating in the windings of the coils *E* and *J*. The reader must remember that pulsating current is never reversed but only interrupted, flowing *always* in the *same* direction.

106. *Operation of the biased ringer.* Suppose that pulsating current should be used with this type of ringer but that the

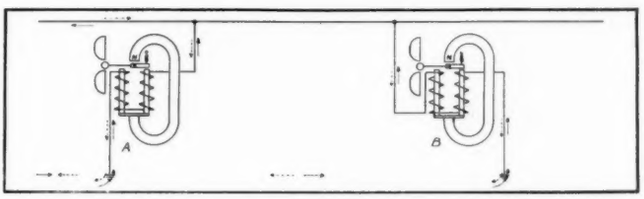


Fig. 39. Principle of Biased Polarized Ringer.

connections were reversed so that current would flow in the direction shown by the dotted arrows in Fig. 38-*A*. An application of the rule for determining the magnetic polarity of an electromagnet will show that the magnetic spectrum will now be as shown in Fig. 38-*R*. Owing to the absence of iron in the left end of the armature *I*, the total air gap is longer and the reluctance of the circuit much greater. Therefore the magnetic field under this condition is much weaker than when the current flowed in the other direction. This means that the armature, *I*, now occupies the position in which it will include, in its own mass, the greatest possible number of lines of force. Therefore there will be no movement of the armature and the clapper G will not be disturbed. The bell will *not be rung*. It is this fact which renders this type of ringer necessary.

If two ringers are connected to the same circuit but have their terminals reversed relative to the common circuit, pulsating current flowing in one direction will sound one bell but not both. On the other hand, if the direction of the flow of pulsating current is reversed, the first bell will remain silent and the second one will be sounded. This will be quite clear when it is remembered that for each direction of current flow in the line wire, one of the ringers will have current through its coils in such a direction as to move its armature. The other ringer, under these conditions will have current through its coils in such a direction as to leave its clapper undisturbed. This condition is represented diagrammatically in Fig. 39. To sound one of these ringers, the pulsating current will necessarily take the direction shown by the solid arrow. To leave the station marked *A* silent and to ring the bell at *B*, the current must be in the opposite direction as shown by the dotted arrow. The reader should note that these two biased ringers are exactly alike, but that their terminals are reversed relatively as they are connected to the line wire and the earth return.

(To be Continued)

Some Girls!

In a voting contest, which was recently put on by the Gem and Jewel theaters of Sherman, Texas, Miss Rena Haskell, long distance operator for the Grayson Telephone Co., at Sherman, won the first premium, which consisted of a Ford touring car and also a cash prize of $53. Miss Eunice Leache, bookkeeper for the same company, won a $53 cash prize.

There were two other $53 prizes offered, but the telephone girls did not compete for them. C. A. Shock, manager of the Grayson Telephone Co., stated that if they had, they certainly would have gotten them. The theater manager is considering barring the telephone girls in future contests.

A Small Town Situation

Being Neutral—Duty of Commissions—Some Fight Penalties

By J. C. Kelsey

Two of your friends engage in a quarrel. You try to bring about peace, or you try to be impartial towards both. At once, your lot becomes one of misfortune. You are trusted by neither side. The chances are that your two warring friends will patch up peace and unite against you.

It is amusing to read the comments upon our national neutrality. An English speaker lashes himself into a frenzy, denounces us for not formally protesting against the violation of Belgium's neutrality, and in fact, for not appreciating the glorious ambition of England to save the world.

The German speaker denounces us for allowing firearms and ammunition to be shipped to England and France and intimates that our love for England will get us a deserved whipping some day.

We all know that Belgium's neutrality was a joke. And we know, too, that neither combatant is fighting for the world. Each is fighting for its national life, and every advantage will be taken by the victor.

Being a friend of both countries, as far as friendship goes, has proved to be anything but agreeable. We would be foolish to put an embargo on arms, and we would be more foolish to accept England's dominance.

Being neutral certainly has its terrors. It truly is a thankless job. I thought of this last week as I listened to a telephone meeting. It was held in the opera house of a small town. There were free cigars. A hundred business, as well as professional, men ate ice cream and cake toward the close of the meeting.

This meeting was held in an Illinois town which lies in the center of the richest farming community in the world. There is not an acre that could be bought for less than $250. Its income sends boys and girls to Champaign, Yale, Vassar and other schools all over the world.

Yet strange to say, the local telephone officials called a meeting of business men because the company was suffering. You would think that a local telephone company in such a community would pay handsomely because men are able to pay good rates.

It brings to mind the oft repeated truism that the richer the farming community and the higher the land value, the less desirable the telephone business is. One would naturally think that every utility of such a community would prosper, but the fact is that they seem to thrive in reverse proportion.

A community where land is cheap and farmers are in debt, allows the local telephone company a chance to make some money. But communities where land runs from $175 to $250 an acre, refuse any concessions. They want $1 per month or they will go in the business themselves.

The object of this meeting was to get an expression from the business men regarding the telephone situation. As you already suspect, the meeting was called to discuss intolerable service conditions caused by the warfare of the local and mutual companies. As you know, rich and prosperous communities inevitably rebel against the greedy and monopolistic charge of $15 per year for telephone service. They had organized a mutual company.

I was particularly interested in the mental conditions of the men at the meeting. There was one predominating condition of mind—that was free service to neighboring towns. If no free service is to be given, the proper server should be the government.

Just how the government will give free telephone service was not fully explained. Strict investigation on my part found nothing else free. The hotel charged for board, the interurban made me pay, and the livery stableman did not forget to charge liberally for taking me from one town to another. The local manager of the telegraph company testified that he gave no free service to neighboring cities. Even the banker admitted that he charged interest on money borrowed from him.

In spite of discovering that no corn was given away, that nothing was free in the locality, the opinion prevailed that no conditions could be decided upon which did not give free telephone service to the neighboring towns.

It made no difference that these free service lines were of single wires and had 20 local stations. It was good enough. It was free and no telephone company should expect pay for toll service.

This truly presents a phase of life peculiar to telephone matters alone. Why should we give our service away? Why are we selected as the sole benefactors of the human race?

But when it came to the appointment of a committee of business men to look into the differences between the companies, matters came to a halt. Each man, pointed out, quickly brought up a good reason for not serving.

It is hard to blame them, seeing that the job of being a neutral nation is such a hard one. It is possibly a fact that the members of the committee would get no thanks from the farmers. All they would get would be a loss of trade, and the price of Rears-Sawbuck stock or some other institution would go up because some innocent merchants of a small town tried to bring about peace.

Such a condition does not call for merchants. It calls for the state utilities commission. The state commission sets the rates, and enforces the penalty of discrimination. It hedges the local company about with fixed restrictions, but lets the other company run wild.

The local telephone company is entitled to protection. It should be allowed a reasonable profit, and it should have safeguards given which will guarantee such a profit.

The law specifically denies a public utility the right to earn above a certain amount; as a corollary, the utility should be protected from deficits.

This particular row started because a very rich farmer would not pay $3 a month for a very long, single party line. He thought he should pay $1 and keep the line all to himself. The state forbids the local telephone company to charge $1 for a private line to one individual and $1 to each one on a long party line.

The state punctiliously enforces the discrimination act, but it does not protect the company after it complies with its orders. It should have compelled the rich farmer to either pay $3 per month, accept the $1 party line rate, or do without a telephone. Instead, it allowed him to go ahead with the formation of a mutual company and practically ruin the local company.

There is much talk about the new morality, but there seems to be little or none on the part of the municipality, state or government.

This morning the papers announce that the government has righteously indicted a few switchboard manufacturers who entered into an agreement to try to make a dollar out of their business. But it never occurs to the governments of city, state or nation that they should keep out of trade restraints themselves.

The game is working one way. The state will restrain the telephone company from giving a private line service for $1 when it normally charges $1 for party line service. It will roar with rage at an offender who dares to try to meet the business requirements of a situation. But it raises no hand to protect the company which complies with its orders.

It might have been sensible to have given the rich farmer the $1 service on his long private line. It would have saved mutual competition. But the majesty of the law did not go this far, it merely burlesqued the situation.

The merchants of the town were wise to make excuses. They were wise to avoid being neutrals. They were wise to leave the matter to the utility commission where it belongs.

They were clever to refrain from usurping the functions of government. They could not tell whether a righteously indignant government would swoop down and indict them for trying to help a distressed business.

This particular local company, seeking relief by calling a meeting of the merchants, has another trouble which should receive attention from the state.

This company connects with a county seat 15 miles away. In the county seat are two companies fighting for supremacy. Both companies meet on the toll board of this small local company and a charge of ten cents is made for a toll connection.

Each company in the county seat has built out deep into the territory of this local company and gives free service to the county seat. Instead of paying ten cents to talk to the county seat, a resident goes over to a neighbor who pays 75 cents a month for one of the warring telephones and saves the money. Regardless of their contract, these two county seat companies built into this local territory.

We have a picture of a telephone Belgium; a local company with local problems, invaded by two warring companies and in a state which has public utility laws. A state which cannot solve such a condition has no right to send robbers to jail or to hang murderers. Its whole system of regulation is a pitiful failure, a roaring farce.

I have no grievance against a mutual company. In many places there is room for both local and mutual companies. My only point is that every one in the telephone business should come under the laws which govern the telephone business.

The state has no right to control one and not the other. Both should come under the same body politic. It would be better for all concerned, for no industry can be injured without all sharing in the burden imposed. We have found this out since the war began.

It reminds me of a story told by an Iowa telephone man. The Quaker asked the farmer how he got his land. He said, "My father gave it to me."

"How did thy father get the land?"

"His father gave it to him."

"How did thy grandfather get the land?"

"He fought the Indians for it."

"Friend," said the Quaker, taking off his coat, "I will fight thee for thy land."

Naturally, the farmer objected, possibly because the Quaker was a larger man, and mostly because he had all to lose and nothing to gain by such a fight.

When a telephone argument comes up in this prosperous community between men whose grandfathers fought the Indians for the land and telephone men, the farmer takes off his coat and tells the telephone man that he will fight him for the telephone company, and he does.

The law would frown upon the transfer of land because of a fight, yet it has no care when a telephone company is transferred because of one. The conditions seem identically the same.

I don't want this construed as an affront to mutual companies. I want them to realize how the situation looks to the telephone man who is losing his property. I want them to realize that it costs much more than even $24 a year to go into the telephone business. When time, teams, gasoline, and all are taken into consideration, there is no money saved by going into the telephone business.

The farmer who would not pay the $3 for a long private line, admitted that it cost him more than that, but he enjoyed the fun. Do you wonder that the business men made excuses?

It reminded me of a fable: Some hard words passed between a boar and an ass, and a challenge followed. The boar, priding himself upon his tusks and comparing his head with the ass's head, looked forward to the fight with great confidence.

The combatants approached one another. The boar rushed fiercely upon the ass who, suddenly turning around, let his hoofs fly with all his might right into the jaws of the boar, so that the latter staggered and fell back wounded seriously.

"Well," he gasped, "who could expect an attack from that end?"

And so before we start into any future warfare, let us remember what the story teaches. Let's not under-rate any competitor.

MORAL: Attacks come from unexpected quarters.

Initial Number of Kansas Association Bulletin.

"The Telephone News" makes its first appearance with the April number, as the official monthly publication of the Kansas Independent Telephone Association. It is the purpose of the association to make this a telephone news bulletin, devoted to information of special interest to Kansas telephone men. The April issue of the "Telephone News" contains a number of interesting news items and commission decisions of interest to Kansas telephone men. A list of all the telephone cases pending before the state public utilities commission is another feature of the bulletin.

Lansing (Mich.) Directory Shows Large Increase.

The new directory for the Lansing, Mich., exchange of the Citizens' Telephone Co., of Grand Rapids, shows an increase of over 300 subscribers over those listed in the previous issue. The Lansing exchange, which operates an automatic system, now serves a total of 3,300 subscribers.

Glen Rock, Pa., Company Taken Over by the Bell.

The Glen Rock & New Freedom Telephone & Telegraph Co., of Glen Rock, Pa., has been purchased by the Bell Telephone Co. of Pennsylvania, for the sum of $9,150. The Glen Rock company has been in operation since 1910 but, it is stated, the business was unprofitable.

The Individuality of the Girls at the Switchboard

Telephone Operators, the Real Operators of the Telephone Business—Their Faithfulness, Loyalty and Resourcefulness—Value of Co-operation and Teamwork Among the Operators—Paper Presented at the Convention of National Independent Telephone Association

By G. R. Johnston

The soldiers of the civil war in their sentimental moods sang not of Tipperary, but of "The Girl I Left Behind Me." This is my topic today, partly sentimental, partly business. We will pluralize it—"The Girls We Left Behind Us." Our conventions have never given due regard to those whom we leave at home to run the business while we go off somewhere to talk about the business.

At the first convention I attended after entering the telephone business, I was met at the door with the demand: "Are you a manufacturer or an operator?" That was a poser. I was no manufacturer and had heard of but one kind of telephone operator. I responded: "I can't tell you; I don't know enough to be an operator; I am only a general manager." Spoken as a joke, it comes to mind occasionally as a true saying. It is to operators in one sense, and of operators in another, that I am speaking.

At the outset I may suggest that you are not like the sailor who has left a girl behind him in every port, and who occasionally spreads out his set of half a dozen photographs and wonders: "Are they true to me?"

The Inconstancy of Woman, an Old Jest.

There is no jest so old, and none so recent, as the inconstancy of woman. When you were seventeen, you may have had your gloomy way through Latin verses lightened by the poet's line, "Woman is always variable and changeable." And you may have said to yourself: "After all, old Virgil may have known almost as much about womankind as we college men." You may go to an opera, and at the height of laughter and applause ask the reason from the banana vender at your side (who is as willing and perhaps as able as yourself to pay his three dollars for a seat) and get the response: "Why, they're singing 'How fickle women are.'"

So it goes. We laugh at them, because we don't believe them. Suppose some Iago should all at once convince you who are here, of any unfaithfulness of your operators at home—of anything indeed short of the steadfast constancy you have known so long that you never question it. What a scene of desolation this room and this hotel would present! No more meetings; just men outward bound, and each praying for some nice, comforting sleet storm. The foundations of the earth would be shaken; and you would have visions of wolves gnawing the bones of your dead plants.

Other gibes that the fun makers could hardly live without relate to feminine curiosity and inability to keep a secret. Do we believe these? The telephone operator has the best chance in the world to listen to other people's affairs and blab about them; and she simply does not.

Again going back to one of my first experiences in the business, I was greatly disturbed one day when an angry rural dignitary complained of the leakage of a message he had telephoned to the state fish warden regarding the plans of some law-breakers to draw a seine. He had called for a deputy from the village exchange booth and only the exchange operator could have informed the seiners. This I took so seriously that I could even sympathize with his story of being stopped as he was going to meet the deputy, grabbed by four limbs, swung out over the river bank to get momentum, and then let go on the outward swing. Investigation disclosed that he had bragged of his own intentions, but the operator, with a brother in the party, had said no word. In nine years since that time has no serious complaint of telling tales been made to me. In those days we used to make much of the secrecy of our form of equipment; there were no operators to listen. We have learned better; where operators are, they don't listen.

We hear something of the spying system of Europe. In Paris, for example, all telephone talk must be in French, somebody does listen and wants to know. It all sounds as foreign to us as the language itself. We don't sense it any better than we sense the life in trenches.

If I should ask you what is the first image that comes to mind when I suggest telephone operators, your answer might be any one of several. Perhaps it is the image of a row of backs on high chairs around the curve of a huge horseshoe, with sundry sentinels making mileage in their rear; or it may be the perspective of such a row viewed from end—a kaleidoscope of hands and arms, moving with fascinating and almost unbelievable rapidity. Maybe you are thinking of the miscellaneous assortment of females that come to the chief operator's employment desk—all sorts of material, a discouraging task of assorting and training; girls who have never learned to work, that is, they have never set their will to any troublesome task for the sake of getting it done; girls heedless, slovenly, bold, indifferent, many of them for your purposes, practically lame, halt and blind. Possibly you are thinking of those whom the chief has selected and schooled, and kept at their places, until you, the manager, have come to know and individualize them—on the information and supervision desks, toll boards, rural exchanges, private branches, and others, separate from the mass and engaged upon many tasks in which they are guiding themselves.

It is as though I might ask you for your vision of the industry of Grand Rapids. It may be of logs and slabs and sawdust; it may be of neat stacks of boards and timber; or it may be of rooms of varieties of handsome, serviceable furniture.

What I want you to think of now is what we may term the diversified finished product, not the girls engaged in the regular machine-like manipulation of cords and keys, for whom, in fact, machinery can be effectively substituted. It is wonderfully skillful work which they perform, developing keenness of sight and hearing, responsiveness, rapidity, concentration, self-control, regard for voice and manners, and other qualities that, in some, mean almost transformation. In this work, however, the limits are comparatively narrow. When the girl has learned it well, there is little left to learn.

Making the Most of Valuable Helpers.

It is to those who have more general work and wider latitude of opportunity that I wish to direct your attention. And my questions are: Have you as many of these valuable helpers as you might have? Are you giving them all the chances to help you that they can and will take?

Perhaps among those occurring to you, is the one you have known longest—who is a little slow with her years, who knows more people than the best politician in your state, and is fairly uncanny in her ability to find them. You have all admired the way some young women keep the rural community in order, with knowledge of everything that is said and done, handling the gossip, the business, the professions, mak-

ing herself the most important factor in each neighborhood. She comes to be the friend of everybody—even according to the boy's definition of a friend—a fellow who knows you and still likes you. You know an operator who ought to be selling cash registers or Packard trucks. Let it be hinted that someone has a notion of talking to Indianapolis, and pretty soon she has him talking over her line. Recovering lost calls is her morning's joy. Another is a lightning calculator of rates. Diplomats are as plentiful as huckleberries. The persuasion of the stubborn or the calming of the angry is just an easy, pleasant part of the day's work. You know one who is tearful and timid, but who will hold on to what she gets in her mind as right with a stronger grip than anyone has ever undone. You know comforters, teachers, executives.

Operators' resourcefulness is sometimes the main reliance of plants with poor and congested lines and equipment. They can do anything, apparently, if only the transmitters will talk. Good operating on a poor plant is 'way ahead of poor operating on the best of plants.

Not to dwell upon loyalty and effort in the recurring times of short forces, I must not forget your girls who in bunches, taken practically as they happen to come, have served you and the public with all their power in times of stress—storms, fires, strikes, floods—when all ordinary efforts and measures fail.

Have we as many of these strong helpful individuals as we might have? Can we not add to their number with a little more appreciation of their worth, and more care in selection and development? Can we place the ones we have so as to better leaven the general lump? Can we get more true cooperation and teamwork among operators? Some now work practically regardless of one another, if not at times antagonistic. Of course, the answer is, that if we do not know that we cannot do these things, they are very well worth trying.

Among methods we can probably give our best attention to three: Individual exchange selection and training; use of rules and practices of general application; meetings at which different operators may become acquainted, get the spirit of general service, and have a chance to discuss and modify the rules and practices.

In the many places where these meetings have been held, the results have been gratifying. The meetings fill a want that we have been slow to understand. Seldom do women of themselves and among themselves develop any system of teamwork. I won't venture on the philosophy of this, but state it as an observed fact. As a counterbalance, however, is their willingness to work in a routine set for them. Give them an authoritative method to follow, or make a fashion of a process, and allow a little time for them to habituate themselves; and upon a continuation of such habits, you can safely depend.

In the preparation of some toll line operating rules recently, the question constantly recurring was not so much—"What is the best way of doing this thing," but, "How far shall we leave the operator to judge the proper course? What discretion shall be left with her?"

I am free to say that my mind is working more and more in the direction of giving the discretion. As between the company and the public, her choice is practically sure to be right. The fact is that the need of exercising such choice is not so great as we may have thought. We all know ways in which people take advantage of party line, rural, pay-station and toll service. Perhaps we have tried to devise checks, or rules, or mechanisms, or charges, or laws, to prevent some of these; but really, the abuses have not been serious. Time goes by, and we ask if they are getting worse. The reply is, "They are not." The task of guarding against public trickiness or dishonesty, never very great, is, if anything, getting less.

Discretion accorded to an operator in dealing with other operators is more of a problem. Teamwork goes better if each person knows in advance what each other is going to do. If one is expecting a given course and another proposes to change it, even for what in the particular case is an improvement, there is a conflict of words, and the service may suffer. But this is just another aspect of the problem of management. Never do we expect to set a system of any kind into motion, and then go off and leave it to run itself successfully.

As a method and system, I am coming more and more myself to believe in the operators' discretion to meet unusual conditions; and by way of preparing them both for routine and exceptional work, more and more to believe in the operators' meetings.

Operators now probably have less supervision from outside their class than any other kind of your workers. If you ever question their interest in your business, let some operator put the converse of the question to you: "Does the manager take any interest in my business?" Now, when you go home, really take an interest in her business, mark her display of zeal, diligence, fidelity and intelligence. It is her due. Build upon it as upon a rock and it will replay you manifold.

Somehow, in the consideration of this subject, my thoughts wander to a sentence of Daniel Webster that used to be in our school readers. Speaking of the British possessions and military posts dotted over the surface of the globe, he said, "Whose morning drum-beat, following the sun and keeping company with the hours, circles the earth with one continuous and unbroken strain of the martial airs of England." And I wondered what such a master of words might have said, if he could have had the vision of the wondrous tapestry that is woven over this wide country, this instant and every instant, keeping company with the seconds, by these good friends of ours at home. Their low voices and nimble fingers take everything for their threads: Love and joy, sickness and sorrow, tools and labor, money and business, printing, shipping, production, destruction, sowing and reaping, pantry and parlor, voter and officer, mischief and protection, sought and found, birth, courtship, marriage, death—the warp and woof of human life.

Connecting Companies to Attend District Meeting.

A meeting of the telephone operators of the Bowling Green, Ky., exchange of the Central Home Telephone & Telegraph Co., together with operators from all the other Central Home exchanges in the central Kentucky district, west of Louisville, will involve something new in the way of efficiency work. In addition to the exchanges included in the Central Home company, eight Independent exchanges with which the Central Home's toll lines connect will be represented at the meeting, to be held May 1, in Bowling Green.

By reaching out for the Independent companies over which the Central Home has no jurisdiction, the aim is to increase their efficiency to the mutual advantage of both. It happens that in each of the eight towns, from which representatives will be present at the district meeting, the Independent companies have competition and so it is much more to the interest of the owners to do what they can to speed up the service, as it will affect both incoming and outgoing business. On previous occasions the Central Home company has invited Independent connecting exchanges to be represented by managers and operators at its district meetings but this is the first time that such a direct effort has been made to enroll these Independents in the work.

At the Bowling Green meeting representatives are to be present from the following Independent companies not affiliated with the Central Home: The Home Telephone Co., Clarksville, Tenn.; the Allen County Telephone Co., Scottsville, Ky.; the Glasgow Home Telephone Co., Glasgow, Ky.; the Hardin County Telephone Co., Elizabethtown, Ky.; the Christian-Todd Telephone Co., Hopkinsville, Ky.; the Henderson Home Telephone Exch., Henderson, Ky., and the Franklin Home Telephone Co., Franklin, Ky. The Central Home exchanges which will be represented are those at Louisville, Owensboro, Russellville, Guthrie, Madisonville and Lewisburg, Logan county.

Impulse Sending Dial—"Nothing New Under the Sun"

Dial of Strowger Automatic Telephone Instrument Same in Principle as Telegraph Transmitter Invented by Wheatstone in 1839 and Patented by Messrs. Cooke and Wheatstone—Article Published Through Courtesy of British Post Office Electrical Engineers' Journal

By T. F. Purves

Among the many ingenious devices developed in connection with automatic telephony, the impulse-sending mechanism which forms part of each subscriber's station holds an essential place. Much care and skill have gone to the perfecting of this important part of the automatic system.

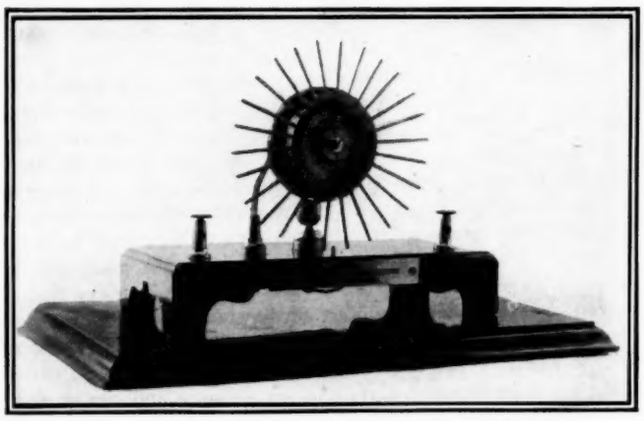


Fig. 1. Telegraph Transmitter of the Automatic Dial Type.

Among various competing types of impulse-senders, the well known Strowger "dial switch" has long been recognized to bear the palm for sweet simplicity of design and manipulation. The happy thought which called into being a plain rotating dial furnished with finger holds to represent the numerals, and arranged to transmit the number of impulses corresponding to each, by the simple act of placing the finger in any numbered position and pulling the dial round to a fixed finger stop, has powerfully aided the Strowger system in the attainment of its present widespread popularity.

The master patent which secured the monopoly of this device was lodged in the United States in 1897 and was granted in England as Patent No. 809, of 1898. During the life of this patent, the designers of other automatic systems were compelled to devise alternative types of impulse controllers for the subscribers' station, some of which were very complex and expensive, while others were obviously attempts to approach the Strowger dial switch as closely as the terms of the patent would allow. The main claims of the patent may be set out as follows: "In a calling device for automatic telephones the combination with a series of pivotally arranged finger holds and of a finger stop adjacent thereto, of a current making and breaking device common to all of the finger holds, such making and breaking device being adapted to operate a series of electromagnets in harmony with the finger holds."

Litigation on the subject, and threatenings of litigation, there have been in plenty. Since the patent expired, in 1912, more than one leading competitor has adopted a frank copy of the Strowger dial, whch now promises to become in its essentials the universal type for automatic telephones.

And all the while this has been going on, no one had given a thought to an old telegraph transmitter invented by Wheatstone in 1839, and patented by Cooke and Wheatstone in that year, which would have been capable, if produced in court, of knocking the bottom out of all these claims.

A long forgotten specimen came to light in a recent clear-out of some old store cupboards at the General Post-Office, and, in the glory of fresh lacquer and glazed mahogany case, has now been added, as item 644, to the engineer-in-chief's museum collection.

A photograph of this interesting historical relic is reproduced in Fig. 1. Its kinship to the automatic dial switch "leaps to the eyes." The "pivotally arranged finger holds" are there in the form of radial spokes, each corresponding to a character on the lettered periphery of the dial. The "finger stop adjacent thereto" is there in the form of a short brass pin fixed in the base below the center of the dial. The "current making and breaking device common to all of the finger holds" is there in the form of a contact spring sliding over alternate insulating and conducting segments on the rim. The purpose of the whole was "to operate a series of electromagnets in harmony with the finger holds."

The function of the instrument as a step by step telegraph transmitter is so obvious that no explanation is required. It was worked in association with a hand switch, which, in one position, introduced the transmitter, and a sending battery in series with it, into the circuit, and in the other position introduced the receiving instrument.

I have managed to secure a photograph, Fig. 2, of one of the latter, which is preserved in the South Kensington Museum. The working parts, which are shown removed from the case, comprise an electromagnet actuating a propelling pawl and ratchet, which serve to rotate a cardboard

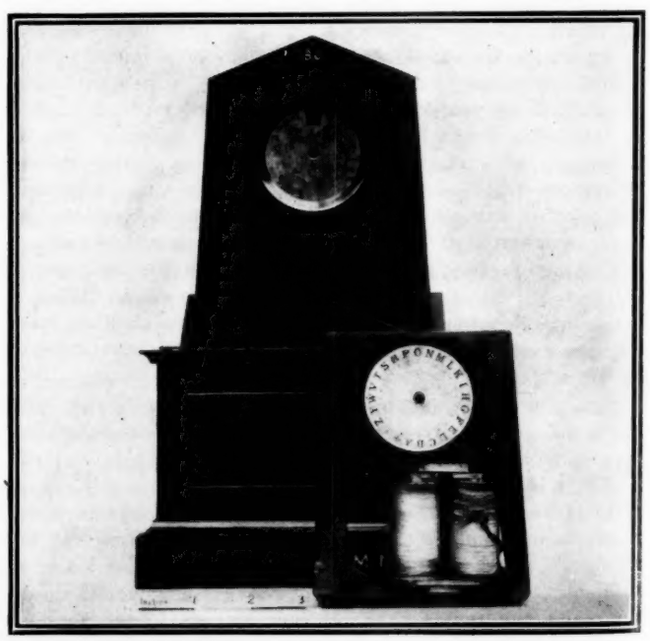


Fig. 2. Receiver for Dial Telegraph Transmitter.

disk bearing the letters of the alphabet. This disk is mounted behind a blank brass face having a single small aperture through which one letter at a time can be seen. Before commencing a message, the dial of the transmitter and the lettered disk of the receiver are set to zero. With

each operation of the transmitter dial, the receiver disk is correspondingly stepped forward, and so exposes the letters successively to view, until the one which is being signalled stops in front of the aperture and is read off by the receiving telegraphist.

A later form was driven by a clockwork train, and the axis of the disk carried an escapement wheel. Pallets fixed

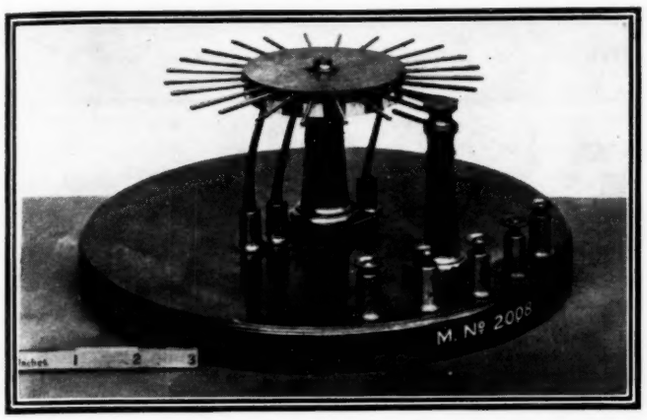


Fig. 3. A Later Type of the Dial Telegraph Transmitter.

to an armature vibrating between the poles of two electromagnets, permitted the disk to progress one tooth, or step, for each current. One circuit on which such instruments are known to have been used was on the Great Western Railway between Paddington and Slough. There is no reason to doubt that they provided quite an efficient and reliable means of low-speed communication, but as telegraphic requirements grew, they had, of course, to give place to systems of higher traffic carrying capacity. Nevertheless, there was a time, about 25 years ago, just before the popular advent of the telephone, when the need for a simple telegraph instrument, requiring practically no skill to operate or to adjust, was experienced in connection with short private wires carrying only a few messages per day. In this connection, the revival of instruments of this early type, had it been thought of, might have been worth serious consideration.

The receiving instrument in the South Kensington collection is accompanied by a transmitter, Fig. 3, which shows a slight development as compared with that shown in Fig. 1. The receiving disk and the transmitter dial both carry numerals and other signs in addition to letters. The dial in this case is horizontal. In addition to the battery and the make and break contact springs, which are arranged to disconnect the transmitter when the dial is turned to zero, there is a third spring which, in the zero position, automatically puts the line to earth, or through to its "down" side, via the receiving instrument, in readiness to receive a message.

In later forms, the axis of the dial was provided with a spur wheel, geared in the ratio of 13 to 1, with a pinion whose axis carried a double coil electromagnet revolving close to the poles of a large compound horseshoe magnet, and so generating a magneto electric current impulse for each half revolution of the pinon, and dispensing with the use of a battery. From this the well known post office form of Wheatstone "A B C," which did so much good service for many years, was gradually developed.

Get-Together Meeting of Employes at Pekin, Ill.

The Citizens Telephone Co., of Pekin, Ill., opened its annual get-together meeting for its operators and other employes on April 21, with about 85 in attendance. The program opened with an address by General Manager George H. Glass on "How to Conduct a Successful Collection," after which Bert Hudson spoke on "The Things I Have Learned in the Telephone Business."

In a paper on "Cable Trouble and How to Find Them," Wm. L. McLaughlin pointed out the various kinds of cable trouble and the methods used to clear them in such a manner as to make them clear to the novice.

"How Can We Increase our List of Subscribers?" is the title of a paper presented by James M. Mount. "Listening on Connections and its Demoralizing Effects" was then discussed in a paper by Mrs. Anna Kessler. Frank Reise spoke on the "Troubleman's Hobby," after which H. F. Cox presented a very interesting and instructive paper on "Cords and Plugs." He first took up the construction of switchboard plugs and cords and their development. He then gave a number of rules to follow in handling the cords, urging the operators to use their brains to relieve their hands of much work, thus making their duties easier and more pleasant.

The afternoon session was opened by Kittie M. Gang, chief traveling operator for the Illinois Independent Telephone Association, who spoke on "General Instructions to Operators." Clarence Gumble then read a paper on "Collection Methods in Small Exchanges," in which he maintained that the principal thing is to furnish the very best of service. "Collections should be made once a month from town subscribers and every six months from rural. Give them to understand that they must keep their bills paid up, and then see that it is done."

Frank Weber discussed "Local Exchange Bookkeeping and Its Relation to the General Office." "Heads of Departments—Organization," was the subject handled by R. L. Carmical. The title of Mrs. Nettie Munhall's paper was "My Experience as a Toll Operator," following which Miss Olive Marrs discussed "The Effects of Good Operating Upon Collections."

In his paper on "Mistakes We Have All Made," Fred Miller emphasized the necessity of co-operation among the employes in order to make the business a success.

In the evening the employes were entertained at a banquet in Hackler's Hall.

Presentation of Edison Medal to Dr. Alexander G. Bell.

The sixth Edison medal, which on December 29, 1914, was awarded to Dr. Alexander Graham Bell, "For Meritorious Achievement in the Invention of the Telephone," will be presented to Dr. Bell at the annual meeting of the American Institute of Electrical Engineers in the Auditorium of the Engineering Societies Building, 29 West 39th street, New York, on Tuesday evening, May 18. Thomas A. Watson, of Boston, Mass., who was associated with Dr. Bell in the early days of the telephone, will give a historical review of the evolution and development of the art of telephony.

The Edison medal was established upon the initiative of a group of friends and associates of Thomas A. Edison, for the purpose of recounting and celebrating the achievements of a quarter of a century in the art of electric lighting, with which the name of Edison is imperishably identified. It was decided that the most effective means of accomplishing this object would be by the establishment of a gold medal, which should, during the centuries to come, serve as an honorable incentive to scientists, engineers and artisans to maintain by their works a high standard of accomplishment.

The Edison medal was, therefore, established and endowed with a trust fund, under an indenture dated February 11, 1904, whereby the American Institute of Electrical Engineers agreed to award the medal annually. The medal is awarded each year by a committee consisting of 24 members of the Institute, to a resident of the United States of America and its dependencies, or of the Dominion of Canada, "For Meritorious Achievement in Electrical Science or Electrical Engineering or the Electrical Arts."

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties —Prepared Under the General Supervision of Stanley R. Edwards—This Section on Economics of Telephony written by James H. Shoemaker

Quiz Questions on the Preceding Installment.

40. Cite an illustration to show varying degrees of ownership.

41. Public ownership as against private ownership is likely to be largely determined by the answer to what question? When will private ownership come to an end?

42. What facts were brought out in the hearing in Chicago on the application of Western railroads for an increase in rates?

43. What three things are shown by the testimony quoted in the preceding section?

44. Why should telephone men be interested in the experiences of railroads? What may be cited as an illustration tending to show the effect of regulation upon the earnings of telephone companies? What publicity is suggested and for what purpose?

CHAPTER III. Ownership and Operation (Cont'd.)

45. *Cause of Existing Confusion.*—An able writer has well said: "There are three reasons for the confusion which exists concerning the valuation of utilities, viz.: It is a matter which is wholly new to most people. Much loose talk has been indulged in. A great deal of inaccurate writing has been done." At least two of these reasons apply with equal force as explanations of the existing disagreement and confusion about public ownership.

There is another important point concerning which many are like the man "who knows not, and knows not that he knows not." Many have not so much as attempted to arrive at an understanding or agreement with themselves as to all the items to be taken under consideration. Then, on top of that neglect, many are wholly blind to the need of an agreed basis for comparison. In this matter of public ownership, as well as in the matter of valuations, many overlook the need of an agreed basis for judging the subjects under discussion. There are many others like the bookkeeper who, when seeking to correct his trial balance, adds and re-adds his long columns of figures, with never a thought of checking back to overcome omissions and erroneous entries. In this all-important matter of ownership many otherwise well informed men compare the merits and demerits in a thoroughly haphazard way, without ever having tried to decide or to agree as to what elements need to be taken into account.

46. *Improper Comparisons.*—One of the most able students of utility economics has called attention to this fact: Certain of the railroads, for instance, of Europe, Asia and elsewhere, have been built principally as parts of the military plant and scheme of the several nations. They were not built primarily as means of transportation for the peaceable activities of business. This student reminds us that here in our own land certain railroads were built primarily as strategic conveniences or necessities in times of great railroad wars. Even in the field of communication, certain telegraph and telephone lines and exchanges have been built more for the purpose of gaining strategic advantages in a so-called war than for any other reason. We are reminded by this authority that an attempt to compare a military railroad with one built solely for business purposes would be as unscientific as to compare a fort, or barracks, with a business block or hotel.

47. *Ownership Analyzed.*—In addition to the two general divisions or classes of ownership, private and public, there are three distinct subdivisions of each general class, as shown in the accompanying table:

Ownership	Private	Individual.
		Co-partnership.
		Corporation.
	Public	Municipal.
		State.
		National.

There are also various degrees of proprietorship; various degrees of the absoluteness of dominion; various degrees of authority of the so-called owner. In other words various degrees of ownership. But that is a matter which will be considered elsewhere.

As referred to in a following section on "A variety of proposals," it is possible for a publicly-owned plant to be operated by a privately-owned operating company. There seems to be no good reason why a privately-owned plant could not be leased to and operated by a municipality or state. These points are mentioned here to bring out the fact that operation is fully as important as ownership.

48. *The Extremists' Mistake.*—Extremists carry on their agitation as though public ownership were a matter of no immediate or practical concern. They discuss the subject as though it were as remote as the canals on the planet of Mars. The extreme opponent of public ownership is apt to say: "It is a craze which will soon disappear." The extreme antagonist of existing private ownership is apt to urge political control and operation of all things in one breath; and, then, in the very next breath, denounce present day politicians for inexcusable mismanagement of everything over which the politicians now have control. The extreme opponent of private ownership is apt to denounce our present administration of the

"civil service" regulations, and, in the very next breath propose that with the present imperfections of that same civil service, the nation should undertake to improve upon the existing practice of private ownership.

Each of these extremists proceeds as though the matter under discussion were a thing to be debated forever, and never decided.

49. *A More Practical View of Public Ownership.*—For the telephone man, however, this is not a theoretical matter at all. We hear a great deal about *national* ownership of railroads and telephones. But the governor of California is now proposing that his *state* shall go into the railroad business. The governor advises California to buy the Western Pacific at the approaching bankruptcy sale. He wants California to make *state operation of railroads* a factor in the transcontinental transportation problem. For the telephone man *municipal ownership* is a very much more practical and immediate problem than is the nationalization of his business.

In a town of 5,000 inhabitants, in the Upper Mississippi Valley, the municipally-owned water and light plants are under the management of the man who owns and operates the telephone exchange. Other operators of privately-owned utilities near that city would have a hard time of it if they undertook to show that publicly-owned utilities are always mismanaged. Near to this place is a town which has a municipally-owned telephone exchange, and a town in an adjoining state which also has a municipally-owned telephone plant. These two municipal exchanges are so connected with the privately-owned systems that their patrons can talk to each other. The two municipally-owned exchanges are connected with the privately-owned toll lines and exchanges for both state and interstate communication.

These pictures of the real conditions of today are given to show that public ownership of telephones is not a mere theory. They are given in proof of the assertion that municipal ownership of telephones is a real issue.

50. *A Variety of Proposals.*—A man of broad experience as a private owner and operator of important utilities, says complete public ownership is the only way by which we will ever be able to get out of our present perplexities. Another, who has carried more than an average amount of responsibility for the private ownership and operation of utilities, suggests that a one-half interest in every utility be publicly-owned and the other half privately-owned. A third, also a man of exceptional practical experience, wants the public to elect half the directors of every utility, leaving the so-called ownership entirely in private hands, as at present.

A fourth proposal was put into practice in Cleveland, Ohio, by the late Tom L. Johnson. Many are surprised when they learn that the street cars of Cleveland are neither publicly-owned nor publicly-operated. The city of Cleveland put up a guaranty protecting the private owners of the property from loss of either principal or interest. The private owners leased their properties to the city. The city, in turn, has given over the property and business to a privately-owned operating company. This plan and practice assumes that a privately-owned operating company can manage and will manage the traction interests of a city more satisfactorily than they could be managed by the politicians of the place.

51. *The Telephone Man's Interest in the Controversy About Public Ownership.*—Many privately-owned telephone plants are for sale, but would-be sellers are not inclined to encourage any municipality, state or nation to buy. The reason for this is not far to seek. The same forces which have hindered the private owner from getting a living rate for his service, are also blocking the lines of procedure to prevent him from transferring his business to public ownership at a living price. "It is naught, it is naught, saith the buyer; but when he has (completed his purchase and) gone his way, then he boasteth" of his shrewd bargain. Thus wrote the author of Proverbs, 3,000 years ago, and this trait of human nature is as much in evidence today as ever. One great trouble about this whole matter of ownership is this: After ownership has been modified by regulation, many of the buyers of the service seem to feel as free as ever to quarrel for low rates.

Under existing circumstances there is little, if any, need of offering advice for the benefit of those who might contemplate originating a new privately-owned utility undertaking, for there is very little tendency in that direction. But the private owners of existing utilities must realize, and in fact do realize, that much of the public ownership agitation is entirely theoretical. They should realize, also, that even a theoretical agitation is like the proverbial potato bug, "powerless for good, but powerful for evil." Hence the private owner is fully as much interested in this public ownership controversy as though it were less a matter of theory on the part of the agitators. The wide awake private owner realizes, also, that many buyers of utility service are more anxious to pay a low rate than to pay a fair rate. He realizes that, by all such persons, public ownership is welcomed as a club with which to pound down the rates of privately-owned utilities.

52. *Need of Standards for Judging Public Ownership.*—We have standards for judging the relative merits of athletes in general and for definitely determining the batting averages of ball players in particular. We have methods, familiar to all, for judging stock, grading grain and scoring butter. It is well to inquire, therefore, whether there is need for equally efficient standards by which to judge, grade, score or compare such weightier matters as public and private ownership of utilities. Upon what basis will privately-owned telephones be finally judged or compared with public ownership?

Most telephone men are familiar with certain standards for telephone service which have been officially ordered by at least two states, Wisconsin and Illinois. Let us endeavor to find out what the practical economists of today have to say concerning the standard which should govern the decision of this matter of public ownership of utilities in general and telephones in particular. The writer has knowledge of only one economist who has spoken, thus far, of this need of an agreed standard by which to measure or judge utilities. In the early part of 1914, this man was heard to say in a public lecture:

> I have made a thorough investigation of the utilities of other nations and a life long study of them here at home. After this investigation and study, I am fully convinced that, all things considered, we have better service at less cost in the United States than can be found, on the whole, elsewhere.

After all his years of study, and after taking all things into consideration, this economist gave it as his conclusion that under private ownership, of telephones and railroads more especially, we obtain a better quantity and quality of service at a lower cost. He referred to the much used argument that is based upon the successful public construction of the Panama Canal and after commending the builder of the Canal in a most thorough manner, said:

If the same means and the same management had been attempted in the construction of a canal from Chicago to the Mississippi River, there would have been difficulties which did not arise in Panama. It is fair to doubt whether the sentiment of our people would have tolerated the exercise of such absolute power and authority as was necessarily practiced by the builder of the canal. If the undertaking had been in a more congenial clime, and if it had been in densely populated and politically harassed Illinois or New York, instead of distant, burning Panama, our politicians would have put a hundred-fold greater pressure upon the general in command to get "snaps" for political "lame ducks."

Our economist said also that, in the beginning, he had followed the prevailing practice as to comparisons. He had assumed that three things—quantity, quality and cost—were the only elements to be considered. But slowly and irresistibly he had been driven to see that as long as he compared nothing of greater importance than those three things, his work was unscientific and untrustworthy. "I have been driven to acknowledge, against preconceived notions," said he, "that our present confusion and disagreement are largely the result of the unscientific and untrustworthy comparisons which have been made. They are largely the result of comparing nothing more important than quantity, quality and cost."

If this speaker was correctly understood, he contended that utilities do these things: They supply definite needs, such as water, light, power, transportation, communication, etc. To supply these needs, they must have a purpose and a practice—a spirit and a standard of conduct. And, utilities are now such a large part of the activities of the people, as a whole, that they are a tremendous factor in determining the purpose and practice or the spirit and conduct of the age.

It was stated in section 41 (TELEPHONY, April 24, page 21) that the real issue, as between private and public ownership of utilities, will be determined in favor of that ownership which can best secure new capital or credit for extensions and improvements. There are three other things which should also be taken into consideration: The quantity, the quality, and the cost of the service; the spirit and practice, or the purpose and conduct, of each utility company in particular and of all companies and all utilities in general; and, the effect which the purpose and practice of the utilities has upon the spirit and purpose of the age. *(To be Continued)*

Operators' School at Minot, N. D.

The operators' school and traffic conference held in the public library assembly room at Minot, N. D., under the direction of the traffic committee of the North Dakota Telephone Association on April 20 and 21, is reported a big success in every respect. There was a large number in attendance, including operators and plant men from Minnesota, Montana, North Dakota and Saskatchewan. The Tuesday morning session opened at 9:30 with a warm address of welcome by Secretary D. S. Hollenga of the Minot Association of Commerce, to which a fitting response was made by Paul Bunce, of Fargo.

Then followed several excellent talks and instructions in the best manner of telephone operating for the purpose of bringing about more uniform methods. Actual demonstrations were made on a switchboard and other miscellaneous apparatus, installed in the library room for the purpose, showing the good and bad ways of giving service. Blue prints and blackboard demonstrations also helped in the educating of the operators.

L. A. Mills, wire chief at Minot, gave some very instructive demonstrations, bringing out the basic principles of operating. In a very able manner he showed all the intricacies of the switchboard and explained how much telephone trouble could be done away with.

Miss Abrahamson, of Minot, followed Mr. Mills with an address on "Voice and Deportment." In line with her remarks, she gave some actual demonstrations as to the fitting manner for the telephone operator to conduct herself. She spoke of the value of a good voice and general deportment in and about the office. Kindly relations between the operator and the subscriber, and the keeping of one's temper were among the suggestions made to the girls.

Addressing the operators on "Essential Telephone Operating Rules," Mrs. Ward, chief operator at Minot, pointed out the real need for these regulations and why they should be lived up to the letter.

At 1:30 o'clock a reception was held for the operators at the Consumers Power Co., and a very pleasant time was passed. Fire Marshal Runge delivered an interesting address on "What to do in Case of Fire."

R. E. Gould, division wire chief at Minot, then gave some valuable instructions on "First Aid to Interrupted Service." An address was delivered by D. C. Crisman, auditor of the Northern Telephone Co. on "Accounting," after which Miss Hendry, of Minot, spoke on "Timing Messages." After an informal discussion the afternoon meeting adjourned.

In the evening the operators were entertained at a theater party.

The Wednesday morning session opened with an address by Miss McCready, traveling chief operator of Minot, on "Cancellations." She encouraged the long distance operators who, when told to locate a party, never cease in their efforts even at the end of the month, if the call has not been cancelled by the subscriber. She upheld this practice as one of the praiseworthy features of the telephone system and urged her fellow workers to live up to it.

Miss Florence Brogan, toll supervisor at Minot, spoke on "Covered Business," reiterating many of the statements made by Miss McCready and urging the operators to do all in their power to attain the highest possible standard of efficiency.

Paul Bunce, district traffic superintendent of Fargo, followed Miss McCready with a very interesting talk on "Telephone Traffic," explaining many of the problems which have to be dealt with.

An exceedingly interesting address by C. H. Coar, superintendent of the Northern Telephone Co., on "Some Features of the Telephone Business," concluded the morning's program.

"Some features of operating" was the title of the opening address at the Wednesday afternoon session, delivered by Frank Morseman, division traffic superintendent at Minneapolis. The remainder of the session was devoted to a question box and a traffic conference.

The banquet tendered the operators at the Leland Hotel in the evening will linger long with the young women as one of the most pleasant memories of their lives. The entertainment feature of the evening, which was the contribution from local artists, included several orchestra numbers, vocal selections, and a group of cabaret singers. C. H. Coar, acting as toastmaster, proved himself fully equal to the occasion, his ready wit and apropos remarks being thoroughly enjoyed by all.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

Order Refusing Rate Increase Enjoined by Court.

Judge George H. Whitcomb in the second division of the Shawnee county district court at Topeka, Kans., has set aside the order of the Kansas Public Utilities Commission, dismissing the application of the Emporia Telephone Co. for permission to raise its rates on the four-party line service in Emporia, on the grounds that the commission's refusal to the telephone company was unjust and deprived the company of the income it is entitled to on the investment.

Judge Whitcomb, at the request of the telephone company, also issued an injunction to prevent the utilities commission from bringing any legal action against the telephone company—should the company raise the rate without first getting permission—until such a time as the commission may decide upon what a reasonable rate for the four-party line service is.

Judge Whitcomb contended that the rate charged at the time the utilities law became effective may have been fair and reasonable, but the figures presented to the court during the trial of the case convinced him that the telephone company's investment at the time the application to raise rates was filed the first of this year, entitled the company to raise the rate on its four-party lines in the city of Emporia.

The Emporia Telephone Co. asked permission to raise its four-party line rate from $1 to $1.25 per month. Under Judge Whitcomb's decision, coupled with his injunction order, the company may place in effect its $1.25 rate only until such time as the commission shall fix a fair and just rate, that meets the approval of the district court.

The counsel for the public utilities commission announced that the case would be appealed to the supreme court. In preparing its case, the telephone company was assisted by the Henrici, Kent & Lowry Engineering Co., of Kansas City.

Illinois Commission Adopts Telephone Service Standards.

The Illinois Public Utilities Commission has adopted conference ruling No. 18 establishing standards of service for telephone companies, to become effective May 31. The rules deal with the elimination of cross talk and noise, the number of subscribers to be connected on local exchange lines and rural lines, the maintenance of lines for through traffic, the proper maintenance of equipment, the employment of a sufficient operating force, provisions for emergencies, the proper handling of calls, the preparation of directories and the elimination of interruptions and irregularities to the service.

The rules, as set forth in this order, are practically the same as the tentative rules which were discussed at the conference held in Springfield by the representatives of various telephone interests in the state, the latter part of January. A summary of these tentative standards was published in TELEPHONY of February 13. Rule 8 in the tentative schedule, setting forth a schedule of speed standards, has been omitted in the conference ruling. Only in one or two minor details are changes made from the tentative schedule.

These rules, the commission states, define a quality of service which will be economical and at the same time reasonably adequate for the public. The commission also states that it realizes the impossibility of establishing general rules which will effectively cover every contingency, and if rigid adherence to the rules prescribed should, in any particular case, result in hardship to the company, or higher rates to the subscribers without a commensurate betterment in service, application should be made to the commission for a modification, giving the reasons therefor.

Ruling in Pearl City, Ill., Telephone Case.

The Illinois Public Utilities Commission recently handed down its opinion in the case of Thomas S. Thompson and David F. Thompson, of the Pearl City Mutual Telephone Co., vs. the Pearl City Independent Telephone Co., of Pearl City, Ill.

According to the order the Pearl City Independent Telephone Co. is required and directed to re-establish within ten days from the date of the order the former connection between the lines of the Kent Independent Telephone Co. and those of the Pearl City Mutual Telephone Co.

It is further ordered that the present connection between the lines of the Pearl City Independent Telephone Co. and the lines of the Kent Independent Telephone Co. be discontinued.

In the complaint the Kent company is alleged to have disconnected its service with the Mutual company and connected with the Independent company's lines, without the consent of the commission. In other words it was alleged that a consolidation was perfected, that the lines were disconnected forcibly and without the knowledge and consent of any of the stockholders, that the lines were taken away from the Mutual company and that so doing automatically effected a consolidation of the Kent Independent and the Pearl City Independent companies' lines, but without the sanction of the commission. It was further declared that because of this action the stockholders or members interested in the Kent company became stockholders of the company which they were alleged to have joined; that this amounted to a confiscation of property of the Mutual company, and that the act was in violation of the public utilities act.

Activities of the Iowa Legislature at Its Recent Session.

During the recent session of the Iowa legislature, which has just adjourned, the Iowa Independent Telephone Association has been very active. Letters have been sent out to all the Independent companies in the state by the association, giving a brief summary of the various bills which relate to the telephone business and the action which was taken on them.

The bill introduced by Senator Chase reducing the width of highways to 50 feet and giving telephone companies ten years in which to move their pole was indefinitely postponed.

The measure giving cities and towns the right to regulate rates and service and connection between competing exchanges, introduced by Senator Whitmore, was recommended for passage by the Senate committee but was defeated by the Senate.

The Crist bill providing for physical connection, including competing exchanges, was passed by the Senate, but was defeated in the House.

The Francis bill for general telephone regulation by the railroad commission was held up awaiting action by the House on a similar bill.

The Thomas bill providing for a minimum wage and maximum hours was defeated in the Senate.

The measure introduced by Senator Whitmore, assessing part of certain street improvements to telephone companies when the street is used for underground work, was indefinitely postponed by the Senate.

The Greene bill for maximum hours of labor for women passed the Senate the day before the session adjourned. A motion to reconsider was filed and so the bill did not reach the House.

The measure introduced by Senator Clarkson, providing for state administration of workmen's compensation insurance, was indefinitely postponed.

The municipal home rule bill, introduced by Senator Arney, was defeated by the Senate.

The Wilson bill, providing for taxation of hedges adjacent to highways, was passed by the Senate but died in the House sifting committee.

The Sheean bill giving the railroad commission authority over telephone, electric light and power wires on highways, primarily for the purpose of determining the relative rights of the two classes failed.

The bill introduced by Senator Chase, materially increasing the benefits under the workmen's compensation law, failed.

The Crist bill for court regulation of public utilities passed the Senate but died in the House sifting committee.

The bill introduced in the House by Representative Slaught, giving cities and towns the right to regulate rates and service and connection between competing exchanges, died in the House sifting committee.

The physical connection bill introduced by Representative Eggleston was withdrawn.

The Schmedika bill reducing the width of highways to 50 feet and giving telephone companies ten years in which to move their poles, was indefinitely postponed by the House.

The Griffin bill providing maximum hours of labor for women, died in the House sifting committee.

The McDermid bill providing maximum hours for women, was indefinitely postponed by the House.

The measure introduced by Representative Jones, providing for telephone regulation by the railroad commission, was defeated in the House.

The Eggleston physical connection bill died in the House sifting committee.

The Griffin bill arbitrarily fixing toll rates very much lower than they are at present, died in the House sifting committee.

House joint resolution 7 and Senate joint resolution 18, proposed an amendment to the constitution providing exclusive taxation of telephone, railroad and similar property for state revenue purposes. Action was indefinitely postponed in the House and the bill was defeated in the Senate.

Commission Regulation of Interference with Power Lines.

The Wisconsin legislature has passed the Frederick bill giving the railroad commission power to regulate interferences with telephone or telegraph service from electric power transmission lines. It was drafted following the annual meeting of the state telephone association in February, and the power companies co-operated in framing a bill satisfactory to all parties to such troubles. Upon the governor's signature, the bill becomes a law.

Conference in Regard to Rules for Overhead Construction.

The Idaho Public Utilities Commission has set May 15 as the date on which it will hold a joint conference with Dr. E. B. Rosa and M. Canada, experts representing the Bureau of Standards of the United States department of commerce, to discuss the rules and regulations relating to overhead construction of power, telephone and telegraph companies. The Bureau of Standards has been making an investigation of its own in order that suitable overhead rules could be drafted.

The fame of the rules adopted by the Idaho commission has spread. Copies reached the Bureau of Standards and the government forthwith communicated with the Idaho commission asking for a joint conference between its representatives and members of the commission. At this conference the Idaho rules will be thoroughly discussed and the government may incorporate many of them in its own set.

Free Telephones Do Not Bar Taxation.

Ruling that free telephone service for city public offices does not preclude the payment of a pole tax, Judge James A. Creighton in the circuit court recently sustained the demurrer of the city of Springfield, Ill., in its case against the Inter-State Independent Telephone & Telegraph Co.

The decision of the judge affects, in this particular case, a debt of $2,800, but the ruling will have bearing on similar suits pending to the amount of $15,800.

In an argument upon answer to the suit, the Inter-State company some time ago alleged that an ordinance passed by the city council on December 9, 1901, relieved it of the obligation of paying the pole tax. In consideration of rights granted the company, it was averred, the Inter-State company agreed to "maintain one telephone of the latest type in each office of the city hall and in each fire house and school in the city and in all other public offices in the city." This agreement by terms of the ordinance was to be in effect 20 years.

By Judge Creighton's ruling the agreement as interpreted by the telephone concern is illegal.

Special Vacation Service to Avoid Removal Orders.

The Central Union Telephone Co., at Indianapolis, Ind., is sending out notices to its subscribers that those who will file notice of their vacation period will be given service during the period at $1 per month for individual line service and 75 cents for two-party service.

This vacation service carries with it a service by operators, who will advise all callers for numbers on the vacation list that the subscriber is temporarily out of the city. The advantage of this service over the customary policy of many of its subscribers, to order the telephone taken out, is pointed out. The company, of course, is anxious to avoid the removal orders and to keep the lines in service, and already has received evidence of the plan being regarded favorably by its subscribers.

Rate Increase Authorized for Neponset, Ill.

The Empire Telephone Co., of Neponset, Ill., has placed into effect the following schedule of rates as authorized by the Illinois Public Utilities Commission:

Individual line business telephones, $18 per year.

Party line business telephones, $15 per year.

Individual and party line residence telephones, $12 per year.

Rural telephones, $12 per year.

Extension telephones, $3 per year.

Extension bells, $1.80 per year.

Desk telephones, $1.80 extra per year.

Formerly the rate for party line business telephones was $12 a year and for rural telephones, $9 a year.

Federal Court Sanctions Merger at Galion, Ohio.

The federal court at Chicago has ruled that a consolidation of the Galion (Independent) Telephone Co. and the Central Union (Bell) Telephone Co. at Galion, Ohio, would be legal. A consolidation has been talked of for some time but it had been a question as to whether or not such a consolidation would be legal. The receivers of the Bell company had sanctioned the consolidation but to make sure that their action on the proposed consolidation would be upheld in the courts, the federal court, at the request of the

receivers of the company, was asked to make a ruling in the matter.

The directors of the Galion Telephone Co. have already given their approval of the consolidation and all that is necessary now to perfect it, is the consent of the state utilities commission.

Board of Trade Favors Merger of Dual Systems.

Resolutions asking for the consolidation of the two competing telephone companies in Wheeling, W. Va., were adopted recently by the directors of the board of trade. Contending that by the elimination of one of the companies users of the telephone will be relieved of a dual expense, the directors voted unanimously in favor of a merger such as they propose.

Copies of the resolution have been submitted to the Bell and Independent companies operating in the city, for their concurrence.

Company Must Not Discriminate in Connection Terms.

A telephone company which allows a second company to connect with its lines must allow the same privilege on the same terms to other companies which desire the connection, is the ruling of the supreme court of Washington in an en banc decision in a Skagit county test case, passed upon about a year ago by the public service commission.

In this case the commission ordered a connection made between the lines of the Skagit River Telephone Co., a subsidiary of the Pacific Telephone & Telegraph Co., with an Independent telephone company, both of these companies serving rural communities in the neighborhood of Sedro-Wooley.

Bill for Telephone Investigation in New Jersey Defeated.

The measure introduced in the House of the New Jersey legislature by Assemblyman Hughes, providing for the appointment of a committee to investigate the operations of the New York Telephone Co. in north New Jersey, was recently defeated by a vote of 24 to 13.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

April: Application filed by the Oleta Telephone Co., of Amador county, for authority to make a charge of 25 cents for messages transmitted from or to the lines of the Pacific Telephone & Telegraph Co. The company also wishes to collect a charge of 15 cents for all messages originating and terminating on its own line.

May 18: Hearing in regard to complaints against the Pacific Telephone & Telegraph Co., at Sacramento, Cal.

CANADA.

April 21: Hearing in regard to complaint of Rev. Father H. Desroches, of Quebec, against the practice of the Bell Telephone Co. of Canada in charging the business rate for telephones installed in the residences of priests.

ILLINOIS.

April 22: The following companies were permitted to change rates and to end discrimination, either through lower charges to stockholders or through special rates to subscribers who own their telephone instruments: Roanoke (Ill.) Telephone Co.; Putnam (Ill.) Telephone Co.; Fayette Home Telephone Co., of St. Elmo; Stark County Telephone Co., of Toulon; Galva (Ill.) Telephone Co.; Westfield (Ill.) Mutual Telephone Co.; Tower Hill (Ill.) Telephone Co.; Greenview (Ill.) Telephone Co.; Knoxville (Ill.) Farmers' Telephone Co.; Queen City & Shelby County Telephone Co., of Shelbyville; Farina (Ill.) Mutual Telephone Co., and the Strawn Telephone Co.

April 22: Agreement between receivers of the Central Union Telephone Co. and the Effingham County Telephone Co., of Altamont, Ill. to operate their lines in connection with each other, approved.

April 22: Agreement between the reorganization committee of the Western Illinois Telephone Co., of Macomb, Ill., and the Schuyler Telephone Co., of Rushville, to operate their lines in connection with each other, approved.

April 22: Agreement between the receivers of the Central Union Telephone Co. and the Grant Fork (Ill.) Telephone Co. to operate their lines in connection with each other, approved.

April 27: Hearing in Chicago on the complaint of the Hotel Sherman against the Chicago Telephone Co. as to rates and service.

April 27: Hearing in Chicago on application of the Boone County Rural Telephone Co., of Belvidere, Ill., for authority to change rates in Boone county.

April 27: Hearing in Chicago on application of the DeKalb County Telephone Co., of Sycamore, for authority to increase telephone rates at DeKalb, Sycamore and Malta.

INDIANA.

April: Application filed by the Southern Telephone Co. of Indiana for permission to issue $1,870,000 worth of stock with which it is proposed to purchase the properties of the Cumberland Telephone & Telegraph Co. in the southern part of the state.

April 20: Application filed by the Citizens Telephone Co., of Kokomo, Ind., for permission to issue $25,000 in notes for the purpose of making various improvements to its system.

April 21: Hearing on petition of the Citizens Telephone Co. for permission to raise its rates on rural telephones in Bartholomew county.

KANSAS.

May 5: Hearing on application of the Baxter Telephone Co., of Baxter Springs, Kans., for permission to increase rates.

MISSOURI.

April 28: Hearing on the application of the Cape Girardeau (Mo.) Bell Telephone Co. to abolish a combination reduced rate.

NEW MEXICO.

April 21: Hearing on complaint of the San Juan county commissioners and the Farmington, N. Mex., chamber of commerce against the Mountain States Telephone & Telegraph Co. The complainants allege that the Mountain States company is guilty of discrimination in what is known as free district service; that it makes an excessive charge for toll service between Aztec and Farmington; that charges for exchange service to certain mutual lines are excessive; that contracts with subscribers for free district service have been unlawfully and arbitrarily cancelled; that charges for toll and telephone rentals over the county generally are excessive, and that inferior equipment is used.

NEW YORK.

April 30: Hearing on the complaint of Frederick C. Weber, of Wales Center, Erie county, for himself and others, against the Federal Telephone & Telegraph Co. and the Erie-Wyoming Telephone Co., as to rates and service.

May 5: Postponed hearing regarding the rates of the New York Telephone Co. in Albany, Cohoes, Waterford and vicinity.

OKLAHOMA.

May 3: Postponed hearing in regard to complaints of Independent telephone companies of Oklahoma, charging that the Pioneer Telephone & Telegraph Co. is making threats or actually removing its toll line connections as a means of forcing the complainants to sign contracts for a division of long distance receipts more generous to the Pioneer than the Independents agree to concede.

PENNSYLVANIA.

April 27: Hearing at Harrisburg, Pa., in regard to the proposed schedule of uniform telephone rates throughout the state, a subject which has been under investigation for nearly two years.

SOUTH DAKOTA.

April 19: Order compelling the Dakota Central Telephone Co. to furnish toll service to the subscribers of the Grant County Telephone Co., at Milbank, S. D.

TEXAS.

April 19: Dallas (Texas) Automatic Telephone Co. granted permission to issue $500,000 worth of stock. In his application President J. C. Casler stated that the funds derived from the sale were to be used exclusively in extension of service.

WISCONSIN.

May 13: Hearing at Madison, Wis., on the petition for a revision of Milwaukee telephone rates. The petition was filed in April, 1910, by Peter Bogart and other citizens, and the city joined in the petition a year later. The railroad commission has recently completed a physical valuation of the Wisconsin Telephone Co.'s physical property for a basis upon which to determine rates.

WASHINGTON.

May 15: Hearing on the valuation of the properties of the Pacific Telephone & Telegraph Co. in the state of Washington. On the valuation to be fixed, as a result of this hearing, telephone rates, both for exchange and toll service, will be based.

Practical Subjects—Letters and Discussions

Converted Intercommunicating System.

Intercommunicating systems have hitherto been designed for use as an isolated installation with exchange service as a secondary consideration. The system described in the following is designed for use with common battery manual exchanges. It can be advantageously installed as a substitute for small private branch exchanges. It combines trunk service with full intercommunicating connections and does not require a local operator.

At the present time, where an existing subscriber desires intercommunicating service, the operating company in many cases has to remove its newly installed central energy type of telephone and substitute it with an obsolete type of telephone using dry batteries and an antiquated buzzer for signaling, with the addition of a seven-way cord between apparatus box and cable. All of these disadvantages are overcome by the very simple connections shown in the accompanying diagram, making use of the standard common battery type of desk stand, with the ordinary alternating current bell in common use on existing installations.

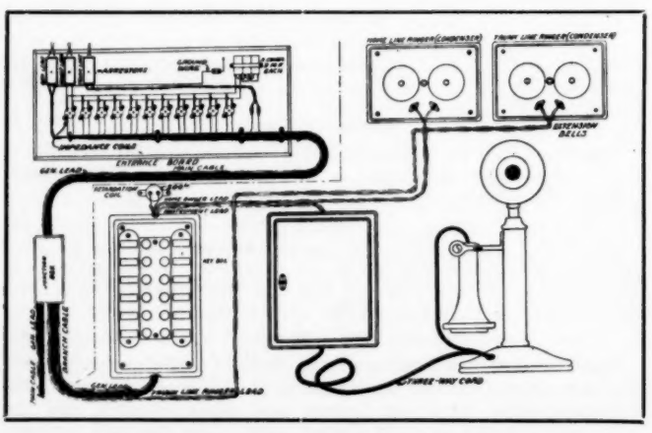
Any one of a number of types of key boxes may be used, together with any of the standard makes of common battery instruments. The system works equally well on 24, 40 or 48 volts, and no inconvenience arises from variation of voltage.

The essential points of the system are as follows:

It is necessary to arrange for two pairs of wires additional from central office to subscriber's premises, one pair for battery and one for generator, just the same as in the case of private branch exchange operation.

The bell box, which contains a condenser and ordinary extension bell (alternating current), is connected directly to the intercommunicating cable pair. The desk stand, which contains a retardation coil and condenser in its base, is connected directly to the "commons" springs of the key box. On each intercom' pair, two retardation coils are introduced between the battery supply pair from central office, and are permanently connected thereto. The generator ringing pair is connected to the outer springs of the key buttons or may be brought through a ringing key, according to the type of box used. Both are equally good.

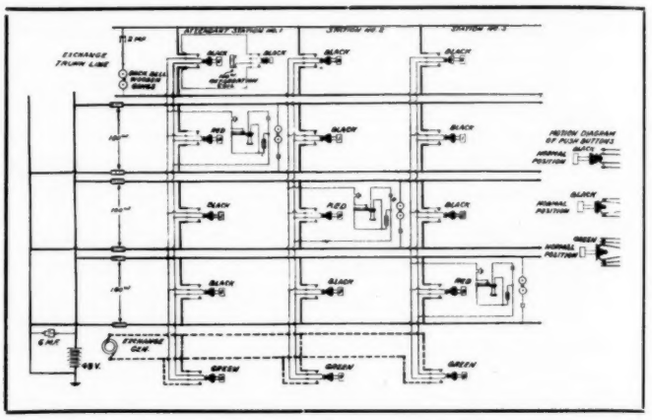
By following the circuit of the diagram, it will be seen



Entrance Board and Assembly of Apparatus.

that when the central office trunk button is depressed, the desk set is in direct connection with central office, the bell portion remaining on the intercom' pair. Thus the latter may be signaled without interference when talking to central. Whenever the intercom' bell rings, the home button is depressed. This action connects the desk stand to the intercom' pair and its bell, thus restoring to a complete telephone set. None of the buttons needs to be restored after completion of conversation.

An attendant station is provided. Any of the stations may be made into an attendant station by connecting an



Converted Intercommunicating System With Trunk Connection.

ordinary extension bell and condenser (alternating current) onto the exchange line at that station. Two or more exchange lines may be connected with the system.

At the attendant station, it is advisable to connect a retardation coil across the inner springs of one of the buttons, with the outer springs multipled to the exchange line. This permits this button to be depressed and the exchange held, while inquiry is made or parties are being called up at other intercom' stations. When parties have been put into communication, depressing any button restores conditions to normal, and removes the holding coil.

This system has been in use for four years. It has been thoroughly tried out and is a considerable improvement on the old type intercom' system. Subscribers readily pay two dollars per station for this service, and in some communities pay one dollar and a half a month for the battery pair and generator pair each, in addition.

It is possible to arrange secret service on this system, a description of which is left over for another occasion.

As a revenue producer, it can be recommended. For example, in a city with 10,000 telephones, surely 500 intercommunicating installations of six stations can be obtained, which would produce $60,000 additional revenue per annum.

H. E. Brockwell, chief engineer,
Winnipeg, Can. Manitoba Government Telephones.

The Value of Systematic Data Regarding Cable Plant.

"Proper study of existing conditions in order to eliminate open wire with present cable capacity" was the subject of a paper read by L. S. Brown, district cableman, of Paris, at a meeting of the plant departments of the eastern district of the Central Home Telephone & Telegraph Company, held at Paris, Ky. A number of very practicable means by which improvements could be gained were suggested. To begin with, Mr. Brown noted that he was not familiar with the constructive history of the different plants in the eastern district, saying he was not sure that it had a "worthy constructive history."

"I do not know what particular school of telephone engineering was so honored by the builders of some of the plants, but am rather inclined to believe that it was just a little school of their own they graced in putting up some of the

plants. 'Putting up' is a more accurate expression than 'constructed.' It is more literal and implies just exactly what the builders intended their labors to accomplish. They put cables high up over tree tops, and made ample allowance for growth of trees. Cables were put up with lag screws, 'L' hangers and marline. (I believe that this faulty construction has caused more cable trouble than anything else.)

The plants were put up and left alone, unmolested, to deteriorate, and we have screaming evidence that they have deteriorated. But the last 18 months, and particularly the last 12 months, has marked an era of reconstruction in the eastern district. At the beginning of this period of reconstruction—this beginning was gradual—many of the plants were in a veritable chaos of confusion.

To begin with, we had a business administration, and now we have an organization. We have, by doing a few big things and a great many little things, facilitated production of big results. One or two plants have been rebuilt, estimates have been put through in others, loose joints have been soldered, houses rewired, bad places cut out of cables, operating has been systematized, and innumerable other things have been done, all tending to progression and subservience to the net result—100 per cent. in collections.

So much for what has been accomplished in a general way, working under conditions which are said to be more or less typical of those in other sections of the country where isolated independent exchanges have been merged into a larger central organization." Having recounted what progress has been made, Mr. Brown notes that much is yet to be done, saying:

"Our cable plants should have special attention. This work can be done at comparatively small cost, as all we have to do is to avail ourselves of our existing resources. We do not need more cable except in a few places where short, small extensions are needed. What we have to do is to utilize cable we have already—for which hard cash has been paid and which has never been used."

To confirm this statement, Mr. Brown quoted a concrete example of a certain section of Paris where he had believed the cable capacity to be inadequate, but upon investigation found that there were a number of vacant pairs available for use.

"Studing conditions is a very simple process. (However, if those taking out telephones took the pains to take down drops, remove fuses and carbons from terminals, and to take jumpers off cable pair in office, and accurate cable records were kept, it would be much simpler.) It is necessary to go to the terminal frame and call in on each frame having a jumper on it in order to ascertain how many vacant pairs are available for use in the territory you intend to study. The next step is to make a sketch of the cable from office to extreme end, and, returning, enter symbolic note of all existing conditions and proposed changes, including size of cable, existing poles, proposed poles existing lateral poles, proposed lateral poles existing terminals and capacity, wooden box or other obsolete equipment to be eliminated or replaced with terminal, junctions of cables and location of drops, and any other data which may be of valuable assistance in this work. It would be necessary to have a standard code of symbols officially prescribed for this work in order to insure uniform and reliable condensation of all data."

Mr. Brown's paper was heard with much appreciation by representatives of the Central Home company present and his ideas will be made known to the other cablemen in the service of the company. Similar methods, it is pointed out, could be employed successfully in other parts of the country where the problem is to make existing equipment go as far as it will and to recognize exchanges which need that kind of attention. In making his studies Mr. Brown, of course, makes all allowance for development probable or possible in the territories under particular consideration.

Book Reviews.

OXY-ACETYLENE WELDING AND CUTTING, by Calvin F. Swingle. Published by Frederick J. Drake & Co., Chicago. 190 pages with 76 illustrations. Price $1.

The use of the oxy-acetylene flame in welding metals, such as steel, cast and malleable iron, brass, bronze, copper, aluminum, sheet iron, etc., is now quite common. This book is intended for the practical man who is interested in such welding. After a brief description of the principal methods of welding, with their advantages and disadvantages, oxygen and acetylene are discussed.

The kind of torches for oxy-acetylene welding are quite fully considered together with the method of making installations for welding purposes. Preheating and annealing are discussed, after which the operation of a welding installation is described, followed by hints in regard to welding.

The closing chapters are devoted to a description of the apparatus for oxy-acetylene cutting and methods of removing carbon from gas engine cylinders.

TELEGRAPH ENGINEERING, by Erich Hausmann. Published by the D. Van Nostrand Co., New York. 406 pages with 192 illustrations. Price $3 net.

This book is intended as a reference book for practicing telegraph and telephone engineers. It is written from an engineering standpoint, the theoretical and practical aspects being correlated.

The general theory of telegraphy is set forth by an explanation of the principles of simplex telegraphy. Duplex and quadruplex telegraphy are next considered, full explanations of the principles involved being given. Automatic and printing telegraphy in their various forms are then described.

The fundamental principles and apparatus used in sending and receiving having been considered, the equipment of the telegraph office is taken up. The protective apparatus switchboards, panels, etc., are described, followed by a discussion of traffic methods.

Miscellaneous telegraphs and their application precede a discussion of municipal telegraphs and a chapter is devoted to railway signal systems. This naturally leads to the subject of lines and cables in the consideration of which materials and construction principles are treated. Included in this section are discussions of inductive interferences on telephone and telegraph lines and the simultaneous uses of lines for telegraphy and telephony.

The theory of current propagation in line conductors with special reference to telegraph lines is considered at some length. Submarine telegraphy is not neglected. The chapter devoted to it discusses the theory, design of cables and the various types of service furnished.

Telephone engineers who are now required on account of the use of telegraphy in connection with telephony, to be familiar with telegraphy, will find this book of great value. The subject is treated in a clear and logical manner. Only representative types of devices are described in order to make clear the general principles.

Consolidation of Competing Plants at Myrtle Point, Ore.

The Coos & Curry Telephone Co., with headquarters at Marshfield, Ore., has sold its local exchange business and plant at Myrtle Point, Ore., to the Coquille Valley Telephone Co., which has merged the newly acquired property with the exchange it was already operating in that town. The subscribers of the latter company are mostly on rural lines.

The companies are still in competition in Coquille, but a physical connection has been made between the exchanges which gives the subscribers of one company access to the lines of the other on the payment of a switching charge of ten cents. This makes a universal service in Coos county and enables 2,000 subscribers of the Coos & Curry company to communicate directly with 500 subscribers of the Coquille Valley company, which was not possible prior to April 1.

From Factory and Salesroom

Convention: Tri-State Independent Telephone Association, Memphis, Tenn., May 21, 22

Kellogg Company in Its New Factory.

The Kellogg Switchboard & Supply Co., of Chicago, is now practically settled in its new building. It will pay any telephone man stopping in Chicago, to take the time—it is only a ten minutes' trip from down town—to visit this enormous factory, so wonderful in reflecting the spirit of Independent telephony. In a forcible way, it impresses one with the tremendous facts of the growth and strength of the Independent telephone movement.

Tall buildings emphasize their space saving and compactness but large structures speak for stability. The very shape of the Kellogg plant gives confidence. Just as we think of durability when we see a picture of the rock of Gibraltar, so many telephone men associate the name "Kellogg" with something very permanent and very sure. It is contended that only a plain fact is stated in referring to this organization as the Rock of Gibraltar of the Independent telephone industry, for, it is asked, what other organization has stood so consistently and so successfully, in spite of difficulties, for the advancement of the great and most important commercial movement in the world—the Independent telephone?

The New Manufacturing Plant of the Kellogg Switchboard & Supply Co., Chicago.

The Kellogg factory contains over nine acres of floor space, approximately 405,000 square feet. It is four stories high (above a basement with a high ceiling and well lighted, purposely of such heavy and durable construction that four additional floors can be added. Indeed, judging by the record of this company in the 17 years since the day of its organization, the additional floor space will be built, and in the not distant future. Three immense courts, any two of which are capable of containing the entire former Kellogg factory, aid in the effective lighting and working arrangement of each room or department. In another issue of TELEPHONY a full description of the new telephone manufacturing plant will appear.

Every visitor is impressed by the efficiency evident in every part of the new Kellogg factory and, as a recent visitor has said, practically voicing the sentiments of all: "The Kellogg company has a magnificently efficient factory."

It is correctly designed and superbly equipped for the planning, building, selling and shipping of Kellogg telephones and switchboards. Here, also, "Use is the Test."

Another Garford Installation.

The Independent Telephone Co., of New Franklin, Mo., recently organized to serve the telephone public in that vicinity, has contracted with the Garford Mfg. Co., of Elyria, Ohio, for a two-position 300-line magneto switchboard of the well known No. 8 type and 150 wall and desk subscriber sets.

The buying committee of the new Franklin company visited several exchanges inspecting equipment before placing its order with the Garford company through the Kansas City Branch.

The Motion Picture Theater as an Advertising Medium.

The motion picture theater affords a wonderful advertising medium through which a telephone company can advertise economically and judiciously with almost an absolute certainty that this form of advertising proves a profitable undertaking.

When taking into consideration the vast crowds of people that patronize picture theaters daily and the concentration with which their minds are occupied while viewing the pictures, it is obvious that at the end of the pictures their minds are still open to absorb with eager interest that which will next appear.

It is here that telephone companies can get in their trump card. By displaying attractive lantern slides during these frequent intervals, bearing a little message of solicitation for new business in a convincing and forcible way, backed by photographs with human interest value, there is no question but that the advertising value of the slide sinks deeply into the minds of the audience.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has just completed a new set of six lantern slides which portray in a comprehensive manner the necessity of the telephone in the home or business establishment.

Considerable expense was involved in the preparation of these slides and they possess the essential qualities of artistic merit and real advertising value.

The Stromberg-Carlson company has prepared a neat little booklet in which the slides are reproduced together with a description of the basic idea upon which each slide was designed. This description of the slide affords the telephone companies an opportunity to analyze the selling points of the slide and tells them why the use of the slide will be to their advantage.

The last page of the booklet serves as an order blank. Space has been provided for filling in the numbers of the particular slides desired. Any telephone company that is interested in advertising of this nature can obtain a copy of this booklet by applying to the advertising department.

Monarch Telephones for Tekamah, Neb.

The Monarch Telephone Mfg. Co., of Fort Dodge, Iowa, recently secured a contract for 200 magneto farm line telephones for Tekamah, Nebraska. These instruments are now being installed by the Tekamah & Farmers Telephone Co. They are being used to replace telephones which had been leased from the Nebraska (Bell) Telephone Co. The farmers company found that it could make a considerable saving by purchasing new telephones and owning them outright. The farmers already own their own lines up to the city limits of Tekamah where they connect with the local company. These 200 instruments are arranged for divided circuit ringing, so farmers ring central secretly, and central rings the telephones on only one-half the line

at one time. This arrangement gives splendid service and with the new Monarch telephones, the farmers will enjoy excellent telephone facilities.

Kerstetter with Carbo Steel Co.

E. L. Kerstetter has been made manager of the pole department of the Carbo Steel Post Co., of Chicago. The company has sold many Carbo poles to telephone companies in the last few years. The establishment of the new department was decided upon as a result of the increasing interest evidenced in the poles which have proved extremely satisfactory to those who have used them.

Through his nine years' connection with the Chicago Telephone Supply Co., of Elkhart, Ind., Mr. Kerstetter has become well known to many telephone men in various parts of the country. Needless to say he knows the requirements of the field. In his new connection, Mr. Kerstetter expects to make the good points of the Carbo steel poles apparent to all telephone men.

A Correction.

The L. S. Brach Supply Co., 143 Liberty St., New York City, wishes to advise that the Type No. 24 non-air gap arrester featured in its advertisement in TELEPHONY of April 17, is intended for signal work only and is not a telephone arrester. This copy was used by mistake.

Telephone Poles Marked to Designate Highway Routes.

The telephone companies have added their efforts to those of business men and automobile owners of central Michigan, to mark out highway routes between the larger cities of this section of the state. Arrangements have been made by the Jackson, Mich., chamber of commerce to paint the telephone and telegraph poles along the route in various colors, each color to designate a particular route.

Canadian Manufacturing Plant Suffers Damage by Fire.

The Toronto branch of the Canadian Machine Telephone Co., at 15 Duncan street, recently suffered considerable damage by a fire which was caused by a flash of lightning. Francis D. Mackay, of the Canadian Independent Telephone Co., is secretary of the Canadian Machine company and Robert Neill is president.

Paragraphs.

R. S. MUELLER, of Cleveland, Ohio, manufacturers' agent and warehouseman, has issued his monthly stock sheet of magnet wire in Cleveland stock on April 21 "for the man who buys."

A New Tool for Cleaning Contact Points.

Every inspector and switchboard man knows what trouble dirty contact points cause. And every manager knows how much it costs to replace platinum points.

The Platinum Point Perfector, which has been placed on the market by the Hinsdale Auto Co., of Hinsdale, Ill., is a tool especially designed for cleaning contact points. It does its work perfectly and quickly. A few touches of the Platinum Point Perfector, the company states, makes the point clean, polished and smooth and it doesn't roughen the surface and wear the platinum as when a file or piece of emery cloth is used.

P. B. X. to be Installed in New Johnstown, Pa., Hotel.

Six trunk lines to the main exchange of the Johnstown (Pa.) Telephone Co., 190 telephones and an up-to-date private branch exchange will be installed within the next few weeks in the Fort Stanwix Hotel, to provide quick and efficient telephone service for patrons of Johnstown's newest and largest hotel now under course of construction.

The Fort Stanwix board will have a capacity of 220 telephones. A total of 190 telephones will be installed, one for every room in the hotel. Communication can thus be established between any telephone in the city system and any room in the hotel through the private branch exchange board.

The six trunk lines will be carried in an underground cable to the hotel, giving direct communication with the main exchange. Work on the installation will begin about May 1.

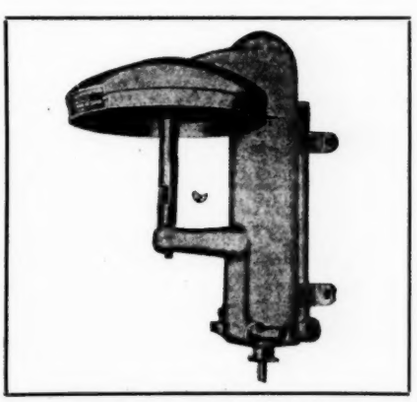
The Peerless Automatic Water Still.

For storage battery maintenance pure water is an essential. Telephone companies in many localities have experienced considerable difficulty in obtaining pure water and in some cases have been forced to resort to impure water, to the detriment of their batteries. If facilities were at hand in the exchange by means of which water could be distilled, there would then be no question whatever of obtaining pure water whenever it was needed. A water still by means of which distilled water may be quickly and economically obtained is manufactured by the Sparta Mfg. Co., of South Bend, Ind. This still, which is known as the Peerless automatic water still, not only furnishes water for batteries but also for drinking purposes, which is another argument for the installation of a still in a telephone exchange.

The city water is supplied to the Peerless still through a pipe from which it passes up the condensing column. The water overflows into the boiling vessel or evaporator, where a constant level is maintained by the overflow. In the evaporator the water is transformed into steam. As this steam is pure hydrogen and oxygen containing no foreign matter, all refuse is left in the evaporator, and only the pure steam passes into the condensing tube. This tube is surrounded by the cool feed water which condenses the steam into chemically pure distilled water, passing out at a spout at the bottom of the still. A special burner of the company's own design, it is claimed, burns such a large percentage of air in proportion to the gas consumed that an unusually hot and large flame results at a minimum cost.

After first adjusting the water supply and lighting the gas, no further attention is required by the still, and it will distill indefinitely, except for an occasional cleaning, which should be given it three or four times a year when used continuously. When cleaning is necessary, the company claims, it can be taken apart and re-assembled in less than three minutes. Where gas is not available, gasoline or kerosene may be used to operate the still.

The company claims that by selling a two week's out-put of



One of the Peerless Water Stills.

one of the stills at the regular price charged for distilled water, it will pay for itself almost twice in that time. The stills are made in three sizes: Model O with a capacity of from two to four quarts; model A with a capacity of four to six quarts and model C with a capacity of eight to twelve quarts.

Out of the Mail Bag

Our Home Study Course, which began in the January 9 issue of TELEPHONY, is meeting with much favor among men in the telephone field who are finding it a valuable ally in their business. Many requests have been received for the early installments, which we are not able to supply at this time, although it was supposed ample provision had been made to cover all requirements. The demand, however, has exceeded expectations and TELEPHONY is now considering the advisability of reprinting the early articles. If sufficient orders are received to cover a portion of the expense, this reprint will be made. It, therefore, behooves those who contemplate ordering these early issues for themselves or friends, to send in their order at once so arrangements can be made without further loss of time.

It is particularly gratifying to note that in Minnesota, where a new utility law was recently passed, leading telephone men agree that TELEPHONY has been helpful in assisting them to arrive at a better understanding of the needs of their business.

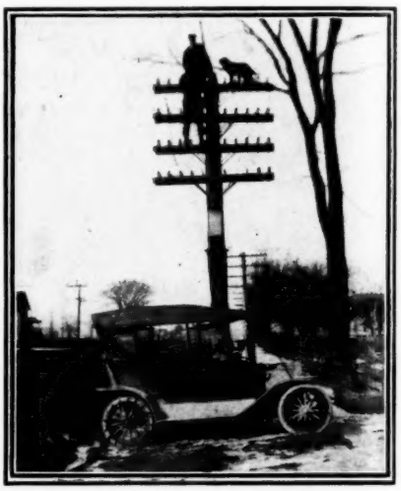
J. A. Melone, president of the Rochester (Minn.) Telephone Co., under date of April 17, writes: "I have just ordered renewal of our subscription to TELEPHONY. At this time I wish to express my appreciation of your journal, every number of which we find of growing interest and value to us. Governor Hammond, of Minnesota, has just signed the bill passed by the legislature placing telephone companies under the Railroad and Warehouse Commission. I am free to say that had it not been for the valuable articles in TELEPHONY, I do not think we would have had a bill as fair to the public and the telephone companies as we now have. The articles in TELEPHONY by James H. Shoemaker have done a great deal to mould the opinion of the Independent companies as to what was most desirable for the public and the companies in a regulative measure such as we now have in Minnesota. We hope that he will continue to be a regular contributor."

James P. Keane, secretary and manager of the Pine Island (Minn.) Telephone Co. who is also president of the Southeastern Minnesota Telephone Association, writes: "The articles in TELEPHONY on your Home Study Course for Telephone Men are excellent, and may be profitably followed by all telephone men. I was attracted to your paper by the articles written by James H. Shoemaker, and have been very favorably impressed by his work. I trust your valuable service will bring you many new subscriptions, and I, for my part, will do all I can to further your cause."

In a letter enclosing his check for subscription, H. E. Wirt, manager of the Lewiston (Minn.) Telephone Exchange Co., says: "I want to give you a word of appreciation and encouragement for the good work that TELEPHONY is doing, and express my belief that no telephone man can afford to be without your paper, and that no live telephone man is operating without it. While TELEPHONY's articles are all good and instructive, I am especially interested in and appreciative of those written by James H. Shoemaker. Through his efforts in this state the past year, Mr. Shoemaker has done much towards awakening the telephone men to a fuller sense of their duty as owners and operators of a public utility. He has been instrumental in inoculating the minds of telephone men with a desire to create a feeling of good will towards the public and the telephone business as a whole."

M. N. Reiland, secretary of the Rollingstone (Minn.) Telephone Co., in a letter dated April 16, says: "Being a reader of TELEPHONY for the last few months I cannot refrain from writing a few words in appreciation of the commendable service you render the telephone man. We need just such a paper as yours in which men of broad ideas and experience who have made their subjects a life study, can talk to us. By their teachings we are enabled to get the best results out of our business and, essential to this, to get the good will of the public we serve. Especially commendable are the able articles on 'Fundamental Principles of the Telephone Business,' written by a man of wide experience and deep thought who is well known to every wide-awake telephone man in Minnesota, James H. Shoemaker. He has done more than any man ever before attempted, by educating and interesting the telephone men of Minnesota in things of vital importance to their business. The result of the telephone companies of Minnesota working as a unit for a fair and just public utility law is a credit to Mr. Shoemaker."

A photo-post card from which the accompanying cut was made, was sent in by C. G. Goft, manager of the Wellington (Ohio) Telephone Co. "The joint inspector is the greatest need," says Manager Goft. He does not specify the breed of the dog on the cross arm, but inasmuch as the canine keeps so close to the pole, we hazard the guess he is related to the Alaskan "husky." Anyway, it is an interesting snap shot.



The Joint Inspector Is a Great Need.

"I greatly appreciate your magazine in my work," says H. O. Woodard, of the Erie County Telephone Co., of Waterford, Pa., in a letter enclosing a remittance for his subscription to TELEPHONY for another year.

John K. Stoltzfus, manager of the Conestoga Telephone & Telegraph Co. at Morgantown, Pa., in a letter remitting for his subscription, says: "I have been a reader of your paper for the last eight years and could not conduct my telephone business without TELEPHONY. I have gotten enough information out of one issue of your paper at times to pay for it a year or two ahead. There is no telephone man who can do without your paper if he wants to be up to date in the management of his plant."

"Please keep your paper coming," says G. McColgin, manager of the Rankin (Okla.) Telephone Co. in a letter enclosing his subscription check. "We read almost every word, including the advertisements."

In writing in to request a change of address, Will A. Ford, manager of the Citizens Co-operative Telephone Co., of Russellville, Ind., says: "I don't want to be without TELEPHONY."

M. H. Winkler, an attorney in New York City, in a letter enclosing his check for subscription, adds: "I find your publication very helpful to any one who is interested in the subject of telephony."

"We do not wish to miss a single number of TELEPHONY," writes the Fargo (Okla.) Telephone Exchange.

In a letter making payment for his subscription R. A. Lizer, manager of the Parker (Kansas) Telephone Co., says: "I want to thank you for past favors, and wish to say a word in appreciation of TELEPHONY. It is without doubt the best and most up to date telephone journal published, so we would not be without it under any consideration."

"We like your paper very much," says C. J. Dunsbee, manager of the Des Moines (New Mex.) Telephone Exchange in a recent letter expressing thanks for advice given him on a telephone query.

What Independent Telephone Companies have long needed was a centralized investment firm. The National Telephone Securities Company serves this purpose and offers every Independent Telephone Company, official and employee a *safe* and *certain* investment besides *numerous* other advantages.

Until the formation of this company almost every Independent Telephone Co. experienced difficulty at some time or other in financing their operations. They were unable to market and sell their bonds; they found it hard to make loans pending sale of bonds and at almost every turn they encountered obstacles.

The men who are interested in and who are directing the National Telephone Securities Co. are all prominent Independent telephone men, and are men of sterling integrity, of executive ability and come highly recommended.

The National Telephone Securities Co. will serve as a bond house and banker for Independent Telephone Companies and it has been unanimously endorsed by both Telephone Associations.

The National Telephone Securities Co. offers the following advantages:

Will find a market and sale for telephone bonds;

Will assist in preparing a bond issue;

Will aid in getting loans pending sale of bonds;

Will aid in financing new construction so as to prevent reinvestment of earnings.

To enable stock dividends to be paid rather than reinvestment of earnings in new construction;

And to invest the money of this company, thus making the earnings from interest and discount.

We are now offering at par an unsold portion of $900,000 preferred stock which will be 5 per cent guarantee cumulative profit sharing preferred stock.

The shares of stock of this corporation have been placed at $50 each. Don't make the mistake of putting this proposition off until later. WHY SHOULD YOU WAIT? It is not necessary to send any money when you file your subscription, as no money will be solicited until enough is subscribed to start operation and then only 50 per cent will be collected —the balance to be paid in quarterly payments divided equally for fifteen months.

Send for subscription blanks.

National Telephone Securities Company

Care H. H. Knipe, Olney, Ill.; *or* 344 Monadnock Bldg., Chicago, Ill.

Record of Telephone Patents Recently Issued

1,133,373. March 30, 1915. SUBSCRIBER CONTROLLED SWITCHING APPARATUS FOR TELEPHONE EXCHANGE SYSTEMS; J. Erickson, Chicago; assigned to First Trust & Savings Bank. The forward rotation of the dial at the subscriber's set transmits an electrical impulse over one side of the line while backward rotation transmits impulses over both sides of the line. The forward rotation effects the operation of the line switch, while the backward rotation operates a first selector switch.

1,133,449. March 30, 1915. MULTI-CONTACT RELAY; H. G. Webster, Chicago. A series of relatively rigid contact members are carried at one end of the magnet structure by an insulating mounting. The contact members are arranged to form a bank. A series of relatively flexible contact members, movable in planes intersecting the plane of the bank, are actuated responsive to the movement of the relay armature to make wiping electrical engagement with the protecting portions of certain of the rigid contact members.

1,133,549. March 30, 1915. PARTY LINE CUT-OUT; W. P. Francis, Prague, Okla. The telephone switchhook is pivoted for vertical and subsequent horizontal movement to control the closing of circuits through two groups of contacts.

1,133,750. March 30, 1915. TRANSFORMER; T. Shaw, Hackensack, N. J.; assigned to American Telephone & Telegraph Co. This transformer is balanced so as to minimize cross talk in phantom circuits. Windings on the core consist of a plurality of pairs of twisted conductors and another winding consisting of a single conductor. The twisted windings in sections are situated on different portions of the core with the sections of the same winding at different distances from the core and the single conductor farthest from the core.

1,133,786. March 30, 1915. MULTIPLE CONTACT RELAY; G. Babcock, Chicago; assigned to F. C. Stevens, Attica, N. Y. This relay is designed for automatic or semi-automatic systems. A plurality of springs are mounted closely adjacent and upon edge in horizontal planes so that the contact making ends are in staggered relation along the horizontal plane. The electrical relation of the springs is controlled by the armature.

1,133,787. March 30, 1915. RELAY DEVICE; G. Babcock, Chicago; assigned to F. C. Stevens, Attica, N. Y. A multiple contact relay having an integral paramagnetic frame mechanically and electrically connected to the extremities of the electromagnet core and pivotally mounting of the armature in closed magnetic circuit with the core, is described.

1,133,796. March 30, 1915. TELEPHONE EXCHANGE SYSTEM IMPULSE TRANSMITTER; J. Erickson, Chicago; assigned to Automatic Electric Co. A calling dial mechanism of the back-and-forth rotary type for automatic telephone instruments, is described.

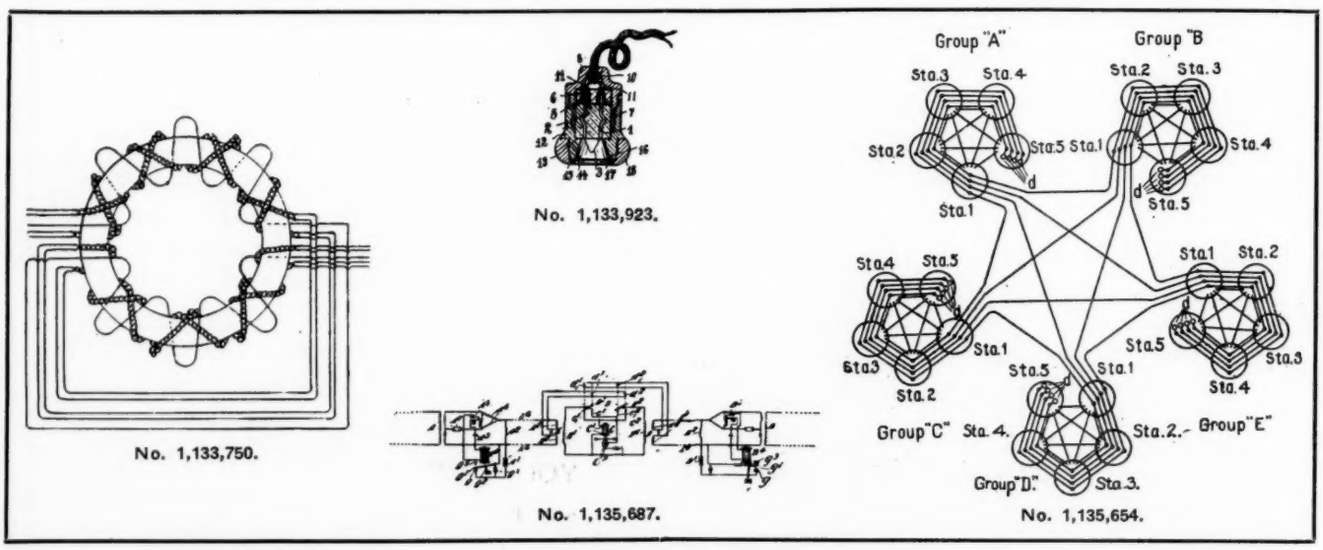
1,133,833. March 30, 1915. HEAD SUPPORT FOR TELEPHONE RECEIVERS; C. Adams-Randall; Boston, Mass., assigned to National Shawmut Bank, Boston, Mass. A cam lever is carried by the head band and adapted to adjustably secure a receiver arm to which the receiver is attached to the band.

1,133,923. March 30, 1915. TELEPHONY; S. G. Brown, London, England. A relay system for reinforcing voice currents is described. The feature is a double pole, overbalancing change-over switch which normally assumes and maintains either of two positions. In one position, a relay energizing circuit, corresponding to one station, is closed and receiving conditions for the distant stations are established. In the other position, the relay energizing circuit for the last-mentioned station is closed and receiving conditions for the first-mentioned stations are established. Voice currents from either station cause the activity of respective electromagnetic devices which move the change-over switch into the operative position for bringing about magnification and transmission of the voice currents to the other stations.

1,134,230. April 6, 1915. AUTOMATIC SWITCHING MECHANISM; J. G. Roberts, Dobbs Ferry, N. Y.; assigned to Western Electric Co. This switch for automatic telephone exchanges is comprised of stationary contact members and a movable contact member, the latter having both a vertical and a horizontal movement.

1,134,236. April 6, 1915. MICROPHONE; H. E. Shreeve, Milburn, N. J.; assigned to Western Electric Co. The container for the granular resistance varying material of this microphonic device has, for one wall, a thermostatic diaphragm adapted to bend inwardly with increasing temperature and outwardly with decreasing temperature, thus to automatically relieve the pressure of the granules upon a tendency to "pack."

1,134,282. April 6, 1915. TELEPHONE KEY; G. E. Mueller, Aurora, Ill.; assigned to Kellogg Switchboard & Supply Co. A key for party line selective ringing is described in this patent. A spring return actuating member for the contacts has three operating positions. Electromagnetically actuated catches hold this member in its second and third positions.



1,134,308. April 6, 1915. TELEPHONE EXCHANGE SYSTEM; J. L. Wright, Washington, D. C.; assigned to F. C. Stevens, Attica, N. Y. An automatic system in which the use of ground connections is avoided, is described in this patent. A set of sluggish relays control the vertical impulses to the switching mechanism, while another set of relays transmit the rotary impulses to the switching mechanism. A quick-acting relay controls, in combination with the sluggish relays, the action of the relays for the rotary relays.

1,134,933. April 6, 1915. TELEPHONE SWITCHING APPARATUS; B. D. Willis, Chicago; assigned to Automatic Electric Co. Finder switches for a semi-automatic system are described in this patent. A pair of voice current conductors for each switch is adapted to be connected to the calling lines by the switches.

1,134,978. April 6, 1915. SEMI-AUTOMATIC TELEPHONE EXCHANGE TRUNKING SYSTEM; E. A. Mellinger, Chicago; assigned to Automatic Electric Co. The feature is a supervisory circuit associated with one of a plurality of trunk lines all portions of which are excluded from the path of the voice currents. A supervisory signal transmitted over a portion of the

HARPOON GUY ANCHOR

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TRIAL ANCHOR FREE

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

talking circuit may be transferred to the supervisory circuit.

1,135,011. April 13, 1915. TELEPHONE SYSTEM AND APPARATUS; C. L. Goodrum, Rochester, N. Y.; assigned to Western Electric Co. In this system, which is automatic, trunking switches comprising terminals arranged in groups have connector switches tied to separate terminals in the groups. Wipers, which co-operate with these terminals, are operated progressively, each movement advancing the wipers over complete groups of terminals and into engagement with the last terminal of each group. Other mechanism is provided for operating the wipers retrogressively into engagement with the other terminals of any group.

1,135,121. April 13, 1915. TELEPHONE EXCHANGE; F. A. Lundquist, Chicago; assigned to Western Electric Co. Another automatic telephone exchange system is described. It includes a series of main switches each consisting of a series of contact points, a contact maker and a magnet for moving the contact maker step by step, over the contact point. The number of main switches is greater than the number of contact points on any one of them. A series of auxiliary switches is also provided equal in number to the number of contact points on one main switch. Each auxiliary switch has as many contact points as there are main switches. Connections are made from corresponding contact points on the main switches to corresponding auxiliary switches and return connections are made from the contact points of the auxiliary switches to normal contact points on all of the main switches.

1,135,643. April 13, 1915. PARTY LINE TELEPHONE SYSTEM; B. D. Willis, Chicago; assigned to First Trust & Savings Bank, Chicago. A party line system for an automatic exchange is described. The taking down of any receiver from a switchhook disconnects all subscribers' instruments from the ground.

1,135,654. April 13, 1915. INTERCOMMUNICATING TRUNK LINE TELEPHONE SYSTEM; R. M. Beard, New York. The stations of the intercommunicating system described are arranged in groups. Separate line wires constitute trunk connections from each group of stations to every other group. Separate local line wires extend between the stations of each group, while the trunk line wires extend through all of the stations of their respective groups. They terminate in a station having signals different from the other stations which constitute a monitor station for each group.

1,135,686. April 13, 1915. THERMO TELEPHONE; Bronislaw Gwozdz, Schlachtensee, near Berlin, Germany. In this thermo telephone, a framelike cast body has a Wollaston wire imbedded in and held by it. The wire passes through an aperture in the frame and its ends project out of the cast body. The portion of the Wollaston wire traversing the aperture is free from its coating.

1,135,687. April 13, 1915. THERMIC TELEPHONE; Bronislaw Gwozdz, Schlachtensee, near Berlin, Germany. An amplification of the instrument described in the preceding patent is covered by this patent. An axially displaceable hot wire device is placed in a casing having contact means for connection to an electric circuit. The ends of the hot wire device are connected to contact members adapted to contact with, and be held in the casing by friction with, the contact means. A member having a sound chamber is secured detachably to the casing and holds the hot wire device therein. The instrument is designed to be placed in the auditory duct of the user.

Legal Cases and Decisions

By A. H. McMillan

No Damages for Wife's Death.

W. O. Rogers brought suit in the circuit court of Graves county, Ky., against the Fancy Farm Telephone Co. to recover $5,000 damages for alleged negligence of the company in failing to give him telephone connection with a physician whom he desired to call to the bedside of his wife. By reason of the alleged negligence the physician, although a message was sent for him, was unable to reach the plaintiff's home in time to save his wife's life. The court held that the husband could not recover for loss of services and society of his wife caused by her death, as it was this loss alone which was sued for.

The reason given for this decision was that at common law a husband could recover damages for the loss of his wife's society from the date of the injury until her death resulting from a negligent act, although she died as the result thereof, provided any appreciable length of time elapsed after the negligent act became operative until her death, during which time the husband could have enjoyed his wife's society. As in this case, there was no appreciable length of time after the alleged negligence became operative and before the wife's death, the court held that there could be no recovery. Rogers vs. Fancy Farm Telephone Co., 170 Southwestern, 178.

A Moot Question.

Some taxpayers of Luverne, Minn., brought suit to restrain the passage by the council and acceptance by a telephone company, of an ordinance pending before the council, granting the company the right to construct and operate a telephone exchange in the city. The telephone company and the city demurred to the complaint and the temporary injunction asked for was denied.

The franchise was then passed and duly accepted by the company, which began the work of constructing the telephone exchange. The complaining taxpayers appealed from the orders sustaining the demurrers to the complaint. The supreme court dismissed the appeals because the action which the suit was intended to prevent, had been consummated so that no real controversy was left except what is called a "moot" case. Henson vs. Northwestern Telephone Exchange Co., 149 Northwestern, 131.

Condition of Climbing Harness.

A laborer was employed under the authority of the division superintendent of the telephone company to assist in the work of building telephone lines. He was engaged to do general work and probably a little climbing. He objected somewhat to the climbing, as he was inexperienced in it. He was told that the company would furnish tools and belts and whatever was needed to work with and would keep everything in repair.

The superintendent of the work furnished him with the harness which he used in climbing but which proved to be defective. The condition of the harness and the weakness of a metal snap were called to the attention of the superintendent. A defect in the snap caused an accident. A judgment for the employe was sustained on the ground that the evidence was sufficient to take the case to the jury on the questions of negligence and contributory negligence. Van Duser vs. Commonwealth Telephone Co. 92 Atlantic, 79.

Removal of Lateral Support.

Suit was brought against the McHenry Telephone Co., of North Dakota, for negligent removal of the lateral support of a building. The theory of the suit was that the company negligently made an excavation and, by not giving the plaintiff notice of the proposed work, made it impossible for him to protect the building. The theory of the company was that although no notice was given, a wall was constructed against the adjoining bank as the work progressed, which gave it all the support that was necessary. The real reason for the fall of the building, the company contended, was that it was not properly constructed, and the injury complained of was caused by defect in the building itself and not by the company's excavation.

The excavation was made in November and the plaintiff testified that there was no sliding of the building until the frost went out in the spring. There was also quite convincing evidence of the poor construction of the building and of the use of an inferior grade of materials in its construction. A verdict was given against the company but the trial judge granted a new trial. The state supreme court held that he did not commit any error in so doing.

Malmstead vs. McHenry Telephone Co., 149 Northwestern, 690.

Garnishing a Telephone Company.

In proceedings to garnish an indebtedness of a telephone company to one Campbell, the company admitted owing him a certain sum, but alleged that one Nunn claimed to own the indebtedness, which had been transferred long before the writs of garnishment were served. It was held that the indebtedness was no longer subject to the garnishment, and that judgment against the defendant company was properly refused. Amarillo National Bank vs. Pan Handle Telephone & Telegraph Co., 169 Southwestern, 1091.

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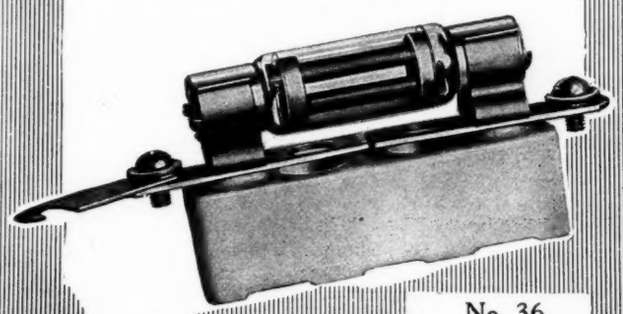

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CAN'T TELL JACK. IT'S AS DARK AS THE INSIDE OF A COW DOWN THERE.
GO OVER TO THAT FARM HOUSE AND SEE IF YOU CAN BORROW A HAND MIRROR SO WE CAN THROW A LITTLE LIGHT DOWN THERE.
ALRIGHT, YOU SQUARE IT WITH THE BOSS, IT'LL TAKE ME 15 MINUTES
WE CAN'T GET THESE PARTS FIXED. LET'S FILL ER UP WE'LL BE OFF THE JOB BEFORE THEY FIND IT OUT
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Condensed News Reports

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

Personal.

BERNARD C. GROH, until recently plant engineer of the Automatic Electric Co., of Chicago, has accepted a position with the Tri-State Telephone & Telegraph Co., with headquarters in St. Paul, Minn., as consulting engineer. He will have supervision over the rehabilitation work on buildings, cable plant and general additions involved in the changing of the Minneapolis and St. Paul systems to automatic operation.

Bernard C. Groh.

Mr. Groh has had wide experience in the duties incident to his new position, having devoted the past two years to the scientific planning of automatic telephone systems. During that time he studied numerous plants, and drew up and supervised the execution of specifications for extensions to existing systems and for changing manual exchanges to automatic.

Mr. Groh has been engaged in telephone work for about 17 years, entering the engineering department of the Michigan Telephone Co. at Detroit when about 20 years old, finally becoming assistant superintendent of equipment for the old Erie system under C. L. Boyce.

He was also chief engineer for the Inter-State Telephone Co. of New Jersey, an Independent company, and afterwards became associated with Dr. Hammond V. Hays, of the American Telephone & Telegraph Co.'s engineering staff in Boston. As construction engineer and engineer in the field, he worked on long distance conduit construction in the vicinity of New York, and was later general plant inspector for the Central District & Printing (Bell) Telegraph Co., at Pittsburgh, under S. P. Grace. Mr. Groh was largely responsible for the standardization of the A. T. & T. construction specifications and methods, and among his construction accomplishments may be mentioned the building of Independent telephone plants at Trenton and Atlantic City, N. J.

In 1910 he became chief engineer of the Subway Telephone Construction Co. in Chicago. When the automatic telephone system in Chicago was turned over to the Illinois Tunnel Co. he became its assistant chief engineer, and after the formation of the Illinois Telephone & Telegraph Co. became its chief engineer.

C. H. MOORE, district commercial superintendent of the Pacific Telephone & Telegraph Co. at Portland, Ore., has been promoted to a similar position at Oakland, Cal.

A. B. WORKMAN, formerly of Minneapolis, Minn., has purchased an interest in the Marseilles Telephone Co., at Marseilles, Ill., and has assumed active charge of the plant.

J. J. COLLINS, district traffic chief for the Victoria division of the Southwestern Telegraph & Telephone Co., has been placed in charge of the Dallas district. J. Y. Hutchinson has been appointed as his successor at Victoria, Texas.

R. E. HILL, formerly with the Cumberland Telephone & Telegraph Co., at Louisville, Ky., has been appointed traffic chief of the Southern Telephone Co. of Indiana, with headquarters in Jeffersonville. His jurisdiction will include the following exchanges: Jeffersonville, New Albany, Charlestown, Utica, Sellersburg, Henryville, Borden, Georgetown and Salem.

CHARLES A. JAMES, local manager for the Federal Telephone & Telegraph Co. at North Tonawanda, N. Y., has been promoted to the office of general manager of the exchanges at Tonawanda, North Tonawanda and Martinsville, N. Y. Mr. James has been with the Federal company nearly two years, prior to which time he was associated with the Kinloch-Bloomington Telephone Co., of Bloomington, Ill.

JOHN A. PRESCOTT, formerly of John A. Prescott & Co., and OTHO C. SNIDER, formerly vice-president and general manager of the Kansas City Home Telephone Co., announce that they have formed a partnership under the firm name of Prescott and Snider and that the business of John A. Prescott & Co. will be continued by them. The new firm will conduct a general investment banking business, including the purchase and sale of municipal and corporation bonds and mortgage loans.

New Companies and Incorporations.

MURDOCK, MINN.—The Murdock & Hayes Telephone Co. has been incorporated with a capital stock of $1,200. The officers are: C. E. Kennedy president; A. J. Johnson, vice-president; A. E. Peterson, secretary; J. Skoglund, treasurer.

GREENWICH, OHIO.—The Greenwich Farmers' Telephone Co. has been organized by R. S. Watts and others with a capital stock of $5,000.

OREGON CITY, OREGON.—The George Telephone Co. has been incorporated by P. Rath, H. Johnson, J. Paulson and H. Klinker.

GREENFIELD, TENN.—The Greenfield Home Telephone Co. has filed articles of incorporation with the secretary of state with a capital stock of $3,000. G. H. Drewery, E. W. Jeter, G. C. Thomas, P. B. Moseley, J. G. Clark, J. A. Coats and N. B. Abernathy are the incorporators.

WAVERLY, TENN.—A charter has been issued to the Farmers' Telephone Co. The capital stock is placed at $1,000. The incorporators are: E. W. Sykes, W. L. Lattimer, W. H. Thompson, Elbert Bryant, H. Carter and W. R. Webb.

MADISON, WIS.—The Summit Telephone Co. has recently filed articles of incorporation with a capital stock of $1,000. The incorporators are C. Moland, R. Schroth and L. Nelson.

Construction.

MASON CITY, IOWA.—The Western Electric Telephone Co. is planning to build a new exchange and also to place part of its wires underground.

DURHAM, N. C.—The Interstate Telephone & Telegraph Co. is planning to spend $25,000 in improving and extending its system.

Financial.

JACKSONVILLE, ILL.—At the regular meeting of the directors of the Illinois Telephone Co. a semi-annual dividend of 3 per cent. was declared. C. Metcalf was elected a director to fill a vacancy.

Elections.

OROSI, CAL.—At a recent meeting of the Orosi-Sultana Farmers' Telephone Co., J. W. McPherson, F. E. Cooke and Roy Demaree were elected to serve as directors.

MAQUON, ILL.—The Haw Creek Central Telephone Co. held its annual meeting recently at which the following officers were elected: President, Wm. Kniser; vice-president, John Housh; secretary-treasurer, A. Stonecipher.

WELLMAN, ILL.—The Wellman Mutual Telephone Co. held its annual meeting recently and elected these officers: H. G. Moore, president; J. A. Dodds, secretary; V. S. Carr, treasurer.

HAVILAND, KANS.—The Hilsan Telephone Co. elected these officers for the coming year at a recent meeting: President, Phil Fleshman; vice-president, O. M. Hindman; secretary, Frank White; treasurer, J. H. Craig.

CLEARMONT, MO.—The Farmers' Telephone Co. elected officers for the ensuing year at a recent meeting as follows: President, H. Bancroft; secretary, Wm. Lemon; treasurer, Jacob Burch.

MONTGOMERY CITY, MO.—The directors of the Peoples Mutual Telephone Co. elected the following officers at a recent meeting: J. W. White, president; C. F. Palmer, vice-president; A. McKelvey, secretary and manager.

REYNOLDS, N. D.—At a meeting of the directors of the Queen City Telephone Co. officers were chosen for the coming year as follows: President, B. A. Dickinson; treasurer, J. W. Moser.

WAUPACA, WIS.—The Rural Telephone Co. elected the following officers for the coming year: P. A. Ham, president; W. L. Wilson, manager.